

INFO WORLD

THE
PC
NEWS
WEEKLY

PRODUCT COMPARISON
HARD DISK DRIVES

Tandy to Sell Laser Printer, 80386 Micro

By Lisa L. Spiegelman

FORT WORTH, TX — Tandy Corp. will introduce an 80386 computer and a laser printer this year, the company said last week.

But Tandy stopped short of declaring that it would definitely make its new machine fully compatible with IBM's PS/2 line.

"Tandy will have an 80386 machine by the second half of the year," said Tandy's senior director of computer products, Mark Yamagata, at a briefing before the company's business computer user group, Tangent. He declined to give any details of the machine, except to say the formal announcement would appear around the end of July.

Yamagata also said Tandy will introduce a laser printer this year at a price under \$2,500. While details were not disclosed, Tandy said its printer will probably be compatible with HP's Laserjet and will probably not include a page description language, although it will be designed to allow future add-ons.

Tandy assured its customers that as the 5 $\frac{1}{4}$ -inch floppy disk standard evolves to a 3 $\frac{1}{2}$ -inch

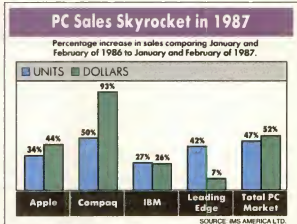
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Apple Transfers Programs To Software Subsidiary

By Rary J. O'Connor

CUPERTINO, CA — Apple's decision to get out of the software business may lead to markedly improved customer support for existing Macintosh applications, users and developers said last week.

But the long-term effect may be to stimulate innovative product development for the Macintosh at a time when most developers see the IBM market



Anticipation of a new IBM personal computer line did not slow corporate sales of IBM PCs, ATs, and compatibles in early 1987.

PC Vendors' Sales Rise Following PS/2 Debut

First-Quarter Surge Continues

By Rachel Parker

Sales of IBM PC and AT compatibles are skyrocketing.

One month after IBM's PS/2 announcement, compatible systems makers report a sales surge as corporate buyers continue to purchase large quantities of current DOS-standard machines. Vendors expect the surge to continue through the summer.

Observers had believed that anticipation of a big IBM an-

nouncement would suppress sales in the first quarter. But financial statements from such companies as Zenith, Tandy, Compaq, and AST indicate that few people waited for IBM.

"The March quarter blew the roof off all projections," said John Gorton, an analyst at Birt Wilson of San Francisco.

"The mystery has been lifted, and a lot of confusion has been cleared out," said Gorton. "A 'vapor' machine is a lot scarier than a real machine that is not entirely compatible."

Many observers believed that Compaq would be most affected by the PS/2 announcement because high-end buyers would wait for IBM's Model 80. But demand has been so strong at Compaq that the company is having trouble filling dealer orders, said Mike Swavely, vice

Continued on Page 85

as much more lucrative, developers said.

Last week Apple announced it was transferring both Macintosh and Apple II applications software to a new, wholly owned subsidiary. The as-yet-unnamed company, to be headed by William Campbell, Apple's former executive vice president of U.S. sales and marketing, would

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Lotus, IBM Join Ranks On Future Development

1-2-3 for OS/2, Mainframes Due

By Edward Warner

CAMBRIDGE, MA — Lotus last week outlined future product plans that include a development and marketing agreement with IBM on mainframe and database products and two separate versions of 1-2-3 for OS/2.

Although not formally announcing product pricing and availability, Lotus said it plans to develop for shipment early next year 1-2-3, Release 3.0, a version with a graphics interface code-named 1-2-3/G, and a mainframe version of the product, 1-2-3/M, that Lotus and IBM will both sell.

The Lotus/IBM agreement also includes development for an unspecified release date of a line of SQL-compatible database products. (See related

story, page 85.)

Lotus 1-2-3/M will accept files uploaded from PC versions of 1-2-3, perform spreadsheet consolidations, and bring 1-2-3 to a new group of users: those working at IBM 3270 terminals, Lotus said. It will run on IBM 370 architecture mainframes under VM or MVS, the company added. 1-2-3/M will offer users at least two command structures for 3270 data transfers: the traditional 1-2-3 interface and an on-screen form similar to that offered with the latest version of Lotus' The Application Connection.

Release 3.0 will run under both DOS 3.0 and in the protected mode under OS/2, Lotus

Continued on Page 8

HP Opens Laserjet Printers To Postscript Language

By George Abruzzese and Eric Lach

NEW YORK — Bowing to user demand, Hewlett-Packard Co. last week announced it will open its Laserjet printer line to several page description languages, including Adobe Systems Inc's Postscript.

"Most users want dual capability, and they want to have Postscript capability just in case they ever have a need for it," said Steve Simpson, HP office printer marketing manager.

HP said it will promote its own Printer Control Language

(PCL) but not sell Imagen Corp.'s Document Description Language (DDL) under its label. HP will promote the PC Publisher Kit board distributed by Imagen.

"Look, who are we kidding on this Postscript business?" said Resa Quinn, Imagen marketing communications manager. "They have been around for two years, and look what they have got — 100, 200 software packages and a lot of OEMs

Continued on Page 6

AT DEADLINE

Compaq Adds 387 Math Chip to 386

Compaq Computer Corp. will announce today performance enhancements to its Deskpro 386, including disk caching and compatibility with Intel Corp.'s 80387 math coprocessor. The Deskpro 386 with a 387 installed is four to five times faster for some applications than an 8-MHz 286 machine with a 287 coprocessor, Compaq said.

Through August 31, an upgrade for current

Deskpro 386s, which only accept 287 coprocessors, will have the same \$999 list price as the 387 option. The disk caching utility, which works with Compaq Expanded Memory Manager software to speed disk-intensive applications through use of expanded memory above 640K, will be available to owners through Compaq dealers.

An Intel representative said last week the 387 math coprocessor will be available for its first

Continued on Page 3

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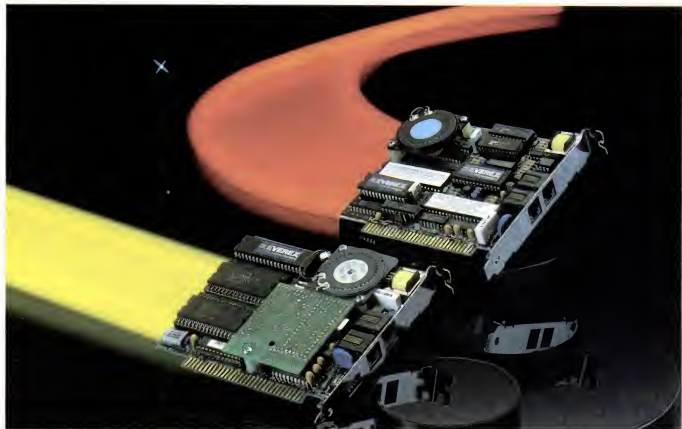
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PC, VAX Ties Highlight Dexpo South Exhibition

Products Enhance Connections

By Scott Mace

NASHVILLE, TN — Vendors showed new products to link IBM PCs and compatibles with DEC's VAX family of mini-computers at Dexpo South here last week.

International Software Corp. of Golden, Colorado, showed a prototype of Multiview, an add-in board for IBM PCs, ATs, and compatible systems that lets users view PC software running in one window and run multiple host-connected sessions — such as on VAX's VMS or the Unix operating system — in other windows, said Michael J. Flanagan, vice president of the firm.

Multiview contains a 12-MHz NEC V50 microprocessor as well as the new Intel 82786 graphics coprocessing chip, which allows users to move and resize the windows without interrupting text that may be scrolling within windows, Flanagan said.

"Multiview could reasonably support four to eight sessions at once," he added.

PC users normally must hit a "hot key" to switch from the running PC software to the session screen, Flanagan said.

Multiview, which should begin shipping in August, fits into an 8-bit slot and has its own RS-232 port, Flanagan added. The program may support the proposed X-Window standard by the time it is released, he said.

The base price of the system, including the board, a 19-inch monochrome monitor with 1,280-by-1,000-pixel resolution, a mouse, and PC and VAX software including an icon-oriented user interface, will be \$5,700, he said.

FEL Computing of Williams, Vermont, showed the latest version of its PC/VAX integration system, Mobius 2.2, on an IBM Personal System/2 running DOS 3.3. Mobius lets users define up to 26 logical DOS drives on a VAX and

allows remote access to the PC from a VAX. FEL officials said. It includes VT-220 terminal emulation with 132 columns on-screen if the PC has either an EVA or Ultra Pak graphics board. FEL also promised support for IBM's new OS/2 operating system.

In addition, FEL and Boston Business Computing of Lowell, Massachusetts, announced joint development of the Mobius Desk Executive, which gives an All-In-One-style user interface to the PC and talks with the VAX via Mobius. The Desk Executive will offload some processing onto the PC and requires Mobius, officials said. All-In-One is a VAX-based off-line automation product from DEC, priced at \$495 for a single host and workstation or \$595 for a version that runs between the PC and VAX via Ethernet. The Desk Executive is due out in June for \$495 per PC.

One Dexpo exhibitor showed a way to run PC software on a DEC VT terminal using the 80386 chip's virtual PC capability. Logcraft Inc. announced 386vax62, a 386-based server that lets up to eight concurrent VAX or Microvax users run PC-DOS programs from a VT terminal. 386vax62 couples to the DEC standard Ethernet network, giving users virtual PC capability and access to all network files and peripherals. It has six PC expansion slots and is available now at \$9,995 for four users, according to Jennifer L. Tyrell, marketing manager at Logcraft of Nashua, New Hampshire.

International Software Corp., 528 Commons Drive, Box 10648 Edgemont, Golden, CO 80401; (303) 526-0388.

FEL Computing, 10 Main St., P.O. Box 72, Williams, VT 05362; (802) 348-7171.

Logcraft, Inc., 410 Amherst St., Nashua, NH 03063; (603) 880-0300.



The AMT 386 Desktop includes an AT-style keyboard and a floppy/hard disk controller.

Company Sells 386 Desktop PC for \$2,000

By Mark Brownstein

American Micro Technology is now taking orders for the AMT 386 Desktop Computer, which is based on the 80386 chip. The base unit sells for \$1,999, with shipment in three to four weeks, according to company president and CEO, Perry Lamba.

The computer, which was designed and assembled in the United States, features 512K of on-board memory and has four 16-bit AT-compatible card slots, two PC-compatible card slots, and two 32-bit slots for RAM expansion. In addition, the AMT 386 Desktop includes a Phoenix ROM BIOS, a 1.2-megabyte floppy disk drive, an AT-style keyboard, and a combination floppy/hard disk controller.

The system also offers a 16-MHz clock rate switchable to 6 MHz and a battery-backed clock calendar. It will accept an 80287 math coprocessor or an 80387 math coprocessor when the latter becomes available, the company said. Memory can be expanded to 4 megabytes on the motherboard. A 64K cache further improves the apparent processing throughput.

A variety of hard disk drives and other enhancement products are available.

American Micro Technology, 14751-B Franklin Ave., Tustin, CA 92680; (714) 731-6800.

IBM Device Links LANs With Host Using TCP/IP

Non-IBM Nets Also Supported

By Sharon Fisher

MILFORD, CT — IBM has announced a device that for the first time will let up to four IBM or non-IBM LANs communicate with an IBM 370 mainframe.

The LAN Channel Station, marketed through IBM's Academic Information Systems (ACIS) business unit here, lets computers on LANs communicate with a mainframe using TCP/IP. IBM announced the device, along with TCP/IP for the VM mainframe operating environment and TCP/IP for the PC, on April 21.

"It allows multiple vendors [networks] to be connected together with a transparent user interface," said Richard Wall, program administrator for ACIS.

Primary customers are expected to be universities, engineering and scientific firms, and the federal government, Wall said. "It's designed for businesses who have multiple nets that aren't SNA."

"I'm extremely gratified they are taking this step," said David Lendman, manager of engineering systems at Intel Corp. in Santa Clara, California.

"Nearly every system I put into my department runs TCP/IP."

"We've been trying to get a device with those characteristics out of IBM for two years," said William Yundt, director of network systems for Stanford University, in Stanford, California.

"IBM has stated that they would follow industry standards," said Clare Fleig, director of systems for the International Technology Group of Los Angeles, California. Users have seen evidence of this in the past 12 to 18 months, she said, pointing to the Ethernet support on the IBM RT PC and on the 9370.

Supported LANs include IBM's Token Ring and PC Network LANs, any form of Ethernet, and Proton. Inc.'s Pronet series of LANs, said Wall. The channel itself has a transmission speed of 3 megabits per second, he said.

Model 001 of the LAN Channel, which supports one channel connector and up to two LANs, costs \$31,000. Model 002, which supports two channel connectors and up to four LANs, costs \$47,700, Wall said. The product will be available in the fourth quarter.

ALR Plans 386-Based System Comparable to PS/2 Model 80

By Mark Brownstein

A "second generation" 80386 computer with performance comparable to that of the new IBM PS/2 Model 80 computer will be announced May 11 by Advanced Logic Research Inc., the company said.

"Our hard disk controller features 1-to-1 interleaving, just like the Model 80," said Gene Lu, president of ALR. That and other hard disk control features make the hard disk perform many times faster than hard disks on other systems, he said.

Performance of the new ALR 386/2 is also increased by using 8-nanosecond static-column RAM, Lu said, adding that operating speeds are comparable to those expected on IBM's Micro Channel Architecture bus.

The basic \$1,990 computer, to ship in June, features 1 megabyte of 32-bit RAM on the motherboard, expandable to 2 megabytes. A total of more than 6 megabytes of memory can be used via standard memory cards. The standard system has one serial port, one paral-

lel port, and eight expansion slots.

A \$3,990 implementation provides 2 megabytes of on-board memory, EMS, Desqview 2.0, and a 40-megabyte hard disk drive and controller.

Both versions have a socket for an 80287 math coprocessor and will run Versions 3.2 and 3.3 of MS-DOS or PC-DOS, Lu said. The computer will accept 3½-inch floppy disk drives in the future.

Advanced Logic Research Inc., 10 Chrysler Ave., Irvine, CA 92718; (714) 581 6770.



ALR's 386/2 features a hard disk controller with 1-to-1 interleaving.

Modular Wyse Systems Offer Flexibility

Wyse Technology this week will introduce modular 80286- and 80386-based systems featuring increased speed and flexibility, the company said. The new systems will be enhanced versions of its Wyse PC line of PC compatibles.

The hardware line will have a modular architecture that offers enhanced capabilities similar to those of a minicomputer environment, said product marketing manager Chris Kryzan. The modular technology allows the

CPU circuitry, currently found on a system's motherboard, to be incorporated into a plug-in card installed in the system's back plane, he said. The architecture results in greater flexibility and simplifies upgrades, Kryzan added.

"There will be a lot more features built-in, and the systems will be faster than anything we've built to date," Kryzan said. Although he declined to name prices of the new systems, Kryzan says they will be

competitive.

"We'll look at our current products and try to set a price-performance standard," he said.

The new systems will be offered in a variety of configurations, including models intended for use as file servers. Other peripherals for the line will be introduced along with the systems, according to Kryzan.

Wyse Technology, 3571 North First St., San Jose, CA 95134; (408) 433-1000.

— Priscilla M. Chahal

AST Releases Two Upgrades Of Its 5251 Emulation Boards

By Mark Brownstein

AST Research last week released two upgrades of its 5251 emulation boards, which connect IBM PCs to IBM 3X minicomputers.

The boards run up to 50 percent faster than AST's earlier 5251 emulation boards, AST said, because of three custom-designed chips and an on-board 80186 processor. The chips include a high-speed bit-sliced communication processor, a twinax protocol handler, and a line driver that provides constant signal levels over long twinax runs.

The Enhanced 5251/11 and Enhanced 5251/11 Plus boards consist of hardware and software that allow a PC to emulate IBM 5251 Model 11, 5291, and 5292 Model 1 terminals. The boards also support bidirectional file transfers between the PC and IBM mini.

The boards now have 128K of on-board RAM instead of the 16K on earlier models. The extra memory frees PC system memory for applications. The boards also support cluster and gateway products more efficiently than their

predecessors, the company said.

In addition, the boards allow PC printers to emulate mainframe printers. Application program interface software simplifies host-to-PC applications. Help screens and configuration menus assist the user in selecting printer and keyboard formats, as well as display attributes. An automatic sign-on utility simplifies host access to the mainframe computer. The software also provides password security and screen "snapshot" capabilities.

The boards, which are compatible with the IBM PC, PC XT, PC AT, Convertible, and compatible computers, connect to IBM System 34, 36, and 38 minicomputers using twinax cable.

The 5251/11 costs \$895, while the 5251/11 Plus costs \$995.

AST Research Inc., 2121 Alton Ave., Irvine, CA 92714; (714) 863-1333.

Both Unix, DOS To Run on Prime 386 Computer

One of the first 386 machines specifically implemented as a multitier system will run Unix and DOS applications simultaneously and will be available in June, Prime Computer said.

The Prime EXL 316 will run the applications using Merge 386 software from Locust Computing. The EXL 316 is the first supermicro to let multiple users run programs for both operating systems at once, Prime said. However, Convergent Technologies Inc. has announced it will use Merge 386 on upcoming systems, and Locust Computing said it has shipped the software to a number of OEMs.

Based on the Multibus II 32-bit bus, the EXL 316 will cost \$23,900 for a standard configuration with 2 megabytes of RAM, a 90-megabyte hard disk drive, a 60-megabyte streaming tape drive backup, connections for 10 terminals or peripherals, and Prime's implementation of Unix System V.3.

Communication links to Prime's 50 Series minicomputers and other systems will be provided via Ethernet cabling and TCP/IP software. A second Locust program, called PC-Interface, will let users switch between Unix and MS-DOS applications and configure the system as a file server or PC network host on Ethernet. PC-Interface will ship in June; Merge 386 should ship in July.

Prime Computer Inc., Prime Park, Natick, MA 01760; (617) 655-8000.

—Tom Moran

With Datapro Reviews Like These, Who Needs Advertising?

Datapro, the highly respected source of research information on the computer industry, just reported that Thomson monitors not only outperform their foremost competitors, they literally "prevail" over them. Here are just a few of the things Datapro said:

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THOMSON
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HP

Continued From Page 1

supporting them. At the low end, Postscript is pretty well entrenched. We know that and so does HP."

A source close to HP said the Palo Alto, California-based vendor was "totally unprepared" for IBM's March announcement supporting Postscript, which many industry observers say made the language the standard.

HP now seems uncertain how to implement Postscript. Simpson said HP and Adobe will co-market it, either as a PC add-in board with DDL or as a separate add-in board for the printer. But another official said HP is negotiating with several Postscript licensees, as well as Adobe.

"Some people will say this is waffling, but I think it is a real smart move," said Arlene Karsh, an analyst at CAP International Inc., a Marshfield, Massachusetts, market research firm, speaking about HP's decision to offer Postscript in addition to DDL for its printers. "Their business is not pushing standards down people's faces, or proposing that one standard is better than another," she said.

CORRECTION

In our April 27 issue, we incorrectly reported that Mitch Kapor had returned to work at Lotus. In fact, Kapor is working as a consultant for Lotus and intends to pursue independent projects when his consulting arrangement ends in July.

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This One



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IBM, Lotus to Codevelop SQL Database Products

By Rachel Parker and Edward Warner

CAMBRIDGE — Lotus' announcement last week of a development and marketing agreement with IBM included a pact to explore development of database products that will use SQL (Structured Query Language).

Lotus said it will develop a database management line, code-named Lotus/DBMS, for OS/2 with Presentation Manager.

er. The products will be optimized for use on a local area network and will be compatible with SQL, the company said.

Lotus/DBMS will offer a variety of front ends likely to include Query-By-Example as well as a programming language, according to Ed Belove, Lotus' vice president of research and development. "Lotus DBMS will follow shortly on the

heels of OS/2 with Presentation Manager," according to Lotus senior vice president Dan McMillan.

Lotus officials would not comment on what relationship, if any, the Lotus/DBMS products would have with the database products being developed with IBM. The IBM/Lotus agreement does not bar Lotus from developing large-systems software for non-IBM hardware, Lotus officials said. Nor does it bar IBM from entering any PC product areas on its own.

The news of the IBM pact "seals the fate of Ashton-Tate," according to industry analyst Michael Gould of the Yankee Group, in Boston. "Obviously, IBM is not going to enter into an agreement with another database vendor."

Ashton-Tate president Ed Esber argued that the announcements leave Lotus open to charges of preannouncing vapors. "We believe what has occurred is that Lotus has taken a product announcement—the announcement of Lotus 1-2-3/M—and turned it into a software development and marketing agreement," Esber said.

"They would have you believe that they have been chosen or knighted by IBM to develop the database as well," Esber said. "In reading all the literature and in discussions with our IBM contacts, that is clearly not the case."

Lotus Details Electronic System for Distribution Firm to Put RFA in Public Domain

By Edward Warner

BOSTON — Lotus last week described its new electronic software distribution system at a developers conference here. The firm also said it would put the Request File Architecture (RFA), connecting PC programs to Lotus' The Application Connection (TAC) running on a host into the public domain.

The Lotus Electronic Distribution System (LEDS) will let users download from mainframe PC programs developed by Lotus, other vendors, and users, said Mary Beth Marion, a Lotus product manager. Among the product's features are trial use, which lets a user download and evaluate a program up to five times before paying, and an audit trail that tells the system administrator who has downloaded which programs.

LEDS will present a list of the available products to a user, Marion said, including the product's price, system requirements, and whether that user is authorized to purchase it. To buy software, a user completes a configuration screen, and the

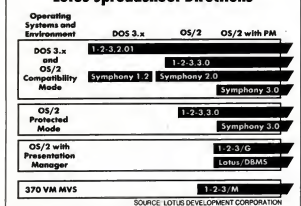
program is downloaded and installed on the PC. Software updates will not erase an earlier version because "we don't want to blow out anything," Marion said. Documentation for larger applications will likely be distributed on paper.

Marion, who would not discuss price or availability, said several large customers are beta testing the product.

TAC, which transfers data between PC applications and several mainframe database management systems, currently requires both PC and mainframe components. Putting RFA in the public domain would permit corporate developers to write programs that directly access TAC on the mainframe, eliminating the need for TAC's PC component, said Maurice Shore, TAC product manager.

Shore said the RFA specifications are available now. Lotus will introduce a TAC developers toolkit in the fourth quarter and will support the VSAM database in the future, he said.

Lotus Spreadsheet Directions



Lotus is developing programs for release next year for a variety of environments, including DOS 3.0, OS/2, and the mainframe 370.

Lotus

Continued From Page 1

said. It will include support for linked and multidimensional spreadsheets and will be fully compatible with Release 2.0, said Edward Belove, Lotus' vice president of research and development. The new version of 1-2-3 is being rewritten in C for portability, the firm said.

All of the features of Release 3.0 will be included in 1-2-3/G, a version of 1-2-3 for the graphical user interface of the Presentation Manager in a future version of IBM's OS/2, Lotus elaborated. Lotus 1-2-3/G will have additional features beyond those of Release 3.0, said Belove, who added that did not mean 3.0 will be only a bridge product. "We're making it very explicit that we're going to continue in both paths," he said.

A new version of Symphony, Version 3.0, is also planned for release in 1988. Lotus' new 1-2-3 family will also include a full-fledged networking version of the product that will go beyond The Networker add-on approach, said Dan McMillan, senior vice president for software products at the company. The networked version will support multiple users on a LAN, he said, and as a result, Lotus will introduce a network licensing plan for large-scale customers.

To let users connect Lotus applications, the firm plans to ship the Lotus Extended Applications Facility early next year, which consists of a programming language similar to Pascal applications and a dynamic data interchange facility that lets users create a two-way, hot-key connection between data in various Lotus programs.

User reaction to the announcements was largely positive. "We were demanding that be done," said Cliff Hodges, supervisor of the PC Services Center at Chevron Information Technology Co., in San Ramon, California, of Lotus' promise that Release 3.0 would use spreadsheet consolidation through multidimensional worksheets.

Some corporate managers, however, questioned whether Lotus will be able to produce a product that runs as fast on the mainframe as on the PC. "I suspect it'll run slow-slow, based on mainframe packages of similar nature," said Martin Maxwell, a governmental micro-computer manager and president of Looking Glass Research, a Lodi, California, software research and development house.

Karl Kendall, information center manager at Metropolitan Life, in New York, expressed doubts about the need for 1-2-3/M. "I find it strange, IBM has a fine spreadsheet on the mainframe," he said, referring to IBM's Applications System.

Apple

Continued From Page 1

become an independent entity in about a year. Apple said it would then maintain an unspecified minority ownership of the independent firm.

The new business will take control of existing applications like Mac Write and Mac Draw, as well as the development of new ones and the possible acquisition of others for the machines, according to Campbell. Systems software products, utilities, and programming languages will remain under Apple's direct control, as will AppleShare and add-in hardware products such as boards linking IBM PCs to AppleLink.

Some users expect the new unit to improve support over Apple's current level. "Support

has been really lacking from Apple," said Mike Bailey, program plans specialist in the Missile and Space Division of Lockheed Corp., in Sunnyvale, California. "I think with their own software house, it will have to get better."

But the chief beneficiary of the move is probably Apple, according to many developers. They said the company held an unfair competitive edge selling software for its own hardware, and Apple acknowledged that it made the move in part to patch those strained relations.

But others said that Apple's real motive was to ensure a continued flow of innovative Macintosh products. To do that, Apple needed to set up a sizable software company free of the ties to IBM maintained by Microsoft — now the largest independent supplier of Macintosh software — and Lotus.

Apple's Software Spin-Off: What's Affected

Moving To New Operation

- Mac Write
- Mac Paint
- Mac Project
- Mac Draw
- Mac Terminal
- Apple II applications

Remaining With Apple

- Finder
- System
- AppleShare
- Switcher
- A/UX
- Utilities
- Programming languages

Apple's software subsidiary will take over all the company's existing Mac and Apple II applications, while Apple will maintain corporate control over system software components and related products.



William Campbell will head up Apple's new subsidiary for its software applications.

"They don't feel they can be dependent on companies that have made deals with IBM," said David Winer, president of Living Videotext. "Without this risk, it is conceivable that they risked that software shipping for the Mac would be as unexciting as that for the Apple IIgs."

"There are more reasons for small independent software vendors to write software for the Mac," agreed Microsoft's president Jon Shirley.

Many developers said they hoped the new entity, which will use its own name and logo, would be truly independent from Apple.

"We will have to see over time how much [the new company] can move away from the Apple name and distribution channels, and become truly independent," said Ed Esber, CEO of Ashton-Tate.

News Briefs

Phar Lap Develops Tools for Model 80

386/DOS-Extender, a run-time environment that allows DOS 3.3 programs to run under protected mode, is now available for IBM's new 80386 machine, the Model 80. The Phar Lap software product is bundled with its assembler/linker/debugger product, 386/ASM/Link.

The Phar Lap product works in conjunction with Pascal and Compilers from Metaware Inc. of Santa Cruz, California. The 386/ASM/Link package costs \$495.

Phar Lap Software Inc., 60 Aberdeen Ave., Cambridge, MA 02138; (617) 661-1510.

Package Creates Expert System from Interview

Intelligence-Ware Inc. has introduced a program it said automatically creates an expert system from the results of a computerized interview, eliminating the need for a knowledge engineer.

Auto-Intelligence automatically generates rules using "structure discovery," drawn through interactive interviews with the system. The program identifies the expert's basic decision-making structure, helps the user identify the most important criteria, and then analyzes the data to induce the expert's knowledge. The program can then be combined with an inference engine or used with other applications, according to Intelligence-Ware.

Automating the process of building an expert system and eliminating the need for a knowledge engineer for some applications will encourage use of expert systems, the company said.

The program, for IBM PCs and compatibles, is priced at \$990. Intelligence-Ware Inc., 9800 S. Sepulveda Blvd., Suite 730, Los Angeles, CA 90045; (213) 417-8896.

Typesetting Software Adds Style Sheets

Magna Computer Systems Inc. recently began shipping an update of its Magna Type typesetting software that adds style sheets and new tabular features.

Version 1.6 includes a library of more than 40 style sheets that offer customizable templates for a variety of books, magazines, newsletters, and business cards.

Continued on Page 10

• DATA MANAGEMENT

In-House Graphics Production Saves Bank Time and Money

By Priscilla M. Chobal

Along with increasing productivity and effectiveness, Commerce Union Bank saved about \$40,000 last year by producing graphics in-house and expects to double that savings in 1987.

With more than 90 offices in Tennessee, Commerce Union of Nashville is one of the largest financial institutions in the state, and a recent merger agreement will soon add another 300 offices along the East Coast, said Van Spicer, information systems manager for the wholesale division.

Spicer is responsible for supplying internal financial data and market and credit information from about 130 cost accounting centers to upper management on an ad hoc, monthly, and quarterly basis. This data is used for analysis, key ratio, and tracking on a 12-month rolling basis to show regression and month-to-month comparisons, and as part of market and customer presentations, he said. "Imagine the huge stack of printouts a \$4 billion holding company would generate monthly," he said. "It's about 10 inches thick."

Before incorporating the graphics products, the executive responsible for the data spent about a week reviewing the printouts, Spicer said. Now, with Chart Master's Datagrabber, the data and graphic analysis is released in less than a day.

"As a result, I take data and turn it into information that's easily accessible and fits into a coat pocket," Spicer said.

With first year costs at one-tenth the usual expense of an outside firm, in-house graphics production has netted an annual savings of about \$40,000, Spicer said.

Spicer uses Ashton-Tate's Chart Master to produce hard copy Master for transparency production with Picture Perfect from Computer Support Corp., and General Parametrics' Picture It and Videoshop for internal and outside 35mm slide presentations, he said.

In addition to accepting text files in the ASCII and DCA formats, the program can import formatted files from a variety of popular word processing packages, including Wordstar, Word Perfect, Multimate, Microsoft Word, Volkswriter, and PFS Write, said Tony Harris, director of marketing for DRI's graphics business unit.

Also available is a feature that allows users to reconfigure their keyboard to emulate the command structure of word processing packages, Harris said. Subject to available memory, documents of any length can be handled, making the program ideal for publishing information from databases, he said.

The program supports Adobe Systems' Postscript page description language, along with a variety of other laser printers and dot-matrix printers.

Digital Research Inc., 60 Garden Court, P.O. Box DRI, Monterey, CA 93942; (408) 649-3896.



GEM Desktop Publisher automatically reformat text to flow around art placed on the page.

Firm to Offer Hypertext Tutorials for 1-2-3, DOS 'Doc Disks' Pinpoint References

By Laurie Flynn

NEWTOWN, MA — Boston Documentation Design will offer in June Lotus 1-2-3 or DOS tutorial programs that employ hypertext techniques for pinpointing the specific references the user needs.

Dos Disk for Lotus 1-2-3 Users and Dos Disk for DOS Users will enable them to move through the program following a series of cross-references and then return automatically to the application. The programs run in the background through the use of a partitioning program supplied by the publisher, according to Neil Duane, president of Boston Documentation.

Hypertext can be described as a nonlinear method of tracing information, according to Paul Saffo, a research fellow at the Institute of the Future, a Menlo Park, California, think tank. He described a thesaurus as an example of hypertext since the reader moves from one entry to another following a nonhierarchical path and because there are always multiple paths to choose from.

The DOS version of Dos Disk features 1,600 cross-references, which can be accessed within DOS using one key, Duane said. The user then follows the references through the documentation and at any time can return to the last place in the application.

"Doc Disks are similar in many respects to how-to books," said Duane. "What we've done is come up with an electronic way of using them." The programs are intended as a quick reference for advanced users as well as a tutorial for novices, he said. Using hypertext techniques makes the programs adjustable to the skill of the user.

Dos Disk for 1-2-3 Users and Dos Disk for DOS Users, which will sell for \$39.95 each, require about 98K of memory.

The company is planning to release a Multimate version later in the year, according to Duane.

Boston Documentation Design, 125 Adam St., Newton, MA 02158; (617) 965-5300.

Multuser Dbase Needs Improved Capabilities OS/2 to Help, Says Ashton-Tate

By Scott Mace

Improved multuser capabilities is a priority for upgrades of base III Plus, said an Ashton-Tate official last week, who acknowledged that multuser PC software is still in a "fairly early stage."

"Most of the multuser database offerings in the microcomputer environment are not what you would call a robust multuser system," said Eric Kim, director of database product marketing at the Torrance, California, firm. "We do believe Base III Plus offers a first level of multuser capabilities."

One criticism of the current multuser Dbase is that applications must be significantly rewritten to take advantage of multuser capabilities. "It's a trade-off choice we made at the beginning," Kim said. "There's nothing inherent that would prevent us from providing an automatic [multuser] feature. The level of data integrity is the issue." Mainframe database systems spend 30 to 40 percent of underlying code to ensure integrity, at performance cost, he added. PC users may not be

willing to pay that price.

Although Ashton-Tate has said it will develop database software for OS/2, Kim said the firm's intent is to support current real mode DOS users. "But it's also a fact that if the user is looking for a level of complete and robust multuser capabilities at par with traditional mainframes and minicomputers, then most likely those capabilities will be provided in the OS/2 environment," he said.

Kim also said Ashton-Tate is developing a compiler for updates. While that will help improve Base III Plus workstation response time, it will not speed access across a network, which is limited by DOS, said Neil Weicher, president of Communication Horizons, a New York member of Dbase programmers' tools.

One technique that could be used to improve network performance would be to implement file- and record-locking techniques from Novell's Netware, instead of relying on the techniques introduced in DOS 3.1, Weicher said.

News Briefs

Continued From Page 9

said Gene Maggard, the company's director of marketing. The user can also create original style sheets.

Once a style sheet is designed, the program's new format tags let users call any style format from a sheet using user-definable English words inserted into a text file, Maggard said.

Added to the program's tabular features are decimal alignment, straddle heads, and automatic vertical and horizontal ruling, Maggard said. Also, commands for changing fonts and setting ragged margins can now be embedded in tab setup commands, he said.

The program is available in two

configurations, Maggard said. For printing to phototypesetters, a version is available for \$8,500. A version for Postscript output sells for \$5,250.

Magna Computer Systems Inc., 14724 Ventura Blvd., Sherman Oaks, CA 91403; (818) 986-9233.

Buttonware Shareware Products Now On Compuserve, The Source

Users are now able to access technical support for and download copies of Buttonware's shareware business products from Compuserve and The Source.

Buttonware's products include the PC-File series of data management programs. Company president Jim Button said he believes the services provide users two major benefits: They're on-line 24 hours a day and don't require long-

distance phone calls. The company will continue operating its own electronic bulletin board.

Buttonware Computer Software, P.O. Box 5786, Bellevue, WA 98006; (206) 746-4296.

Stock-Trading Program Functions With Expert System Functions

Breakout/sts is a new stock-trading program that uses expert system functions to analyze daily stock activity, the program's publisher said.

Announced by Criterion Software, the \$688 expert system shell takes the day's price and volume movements of the stocks in its database and calculates a rating, which it lists in an Expert Analysis Report. The program then advises whether the stock has changed enough to

merit a buy or sell, according to the company.

Once the user has acted on a stock, the results are entered in the Profit Manager program, to which users enter their own stop-loss criteria. Breakout/sts offers a link to both Hale Systems' database of daily stock activity and the Dow Jones/News Retrieval system.

Breakout/sts uses about 25 indicators of stock performance, the company said, based on the experience of experts in money management.

The company is also offering a \$44 demonstration program that will operate for about a month. Criterion recommends an Intel 8087 math coprocessor.

Criterion Software Inc., 916 Southwood Blvd., Suite C2, Incline Village, NV 89450; (702) 831-2999.

Sun to Support Unix Window Management System From MIT

Sun Microsystems has announced support for X Window, the Unix window management system developed at MIT that has received endorsement of many Sun competitors in recent weeks.

X Window 11, due to be released this fall, will include Sun features to ensure compatibility with Sun's Network/Extensible Window System (NEWS), said Eric Schmidt, vice president and general manager of Sun's software products division. The next version of NEWS, scheduled for release in 1988, will have X Window compatibility as well as proprietary NEWS features, he said.

Sun's attempts to have its proprietary window environment adopted as standard were dealt a blow when X Window was endorsed by a bloc of competitors, including Hewlett-Packard Co., Apollo Computer Inc., Data General Corp., and Digital Equipment Corp.

The next version of NEWS is not expected until next year.

Sun Microsystems Inc., 2550 Garcia Ave., Mountain View, CA 94043; (415) 960-1300.

Proximity Announces Electronic Webster's Thesaurus, Dictionary

Proximity Technology Inc. has announced retail sales of its electronic implementations of the Merriam-Webster thesaurus and dictionary, complete with a search-and-retrieval interface.

Proximity will also release an application of its Proximity Search process, which allows a database search with incomplete or fuzzy terms, for use with Ashton-Tate's dBase II and III.

All products are for MS-DOS systems and will be shipped over the summer, according to Proximity. Retail price will be \$89.95 each.

Proximity Technology, 3511 N.E. 22nd Ave., Fort Lauderdale, FL 33308; (305) 566-3511.

Borland Ships Mathematical Analysis Tool Emulating 8087

Borland International Inc. has begun shipping Eureka: The Solver, a mathematical analysis tool for scientists, engineers, and financial analysts.

The \$99.95 program handles problems with undefined variables and "what-if" analysis, going beyond calculator-type functions, according to Borland. It features pull-down menus, editing windows, and definable keys, and supports or emulates the Intel 8087 math coprocessor.

Borland International Inc., 4585 Scotts Valley Drive, Scotts Valley, CA 95066; (408) 438-8400.

BIGGER vs BETTER SILK COMES OUT ON TOP IN THE BATTLE WITH 1-2-3



SILK stands alone as an extraordinary and ingenious spreadsheet and graphics product that will transport you to a new higher level of power and performance. SILK is the result of over 40 man-years of design and development with one focused goal—customer satisfaction through an unsurpassed standard of power, flexibility and ease of use. In a word... productivity!

SILK starts with a computer user interface, so learning SILK is simple. Then add features like: • "Live" context sensitive help so you can learn what you need without interruption • Allocation by command so you don't have to spend hours designing complicated models • Automatic keystroke logging so you'll never over lose your work again, for any reason • Time series model creation with English-language formulas • Built-in validation of your spreadsheet • Built-in goal seeking • Much, much more. You would actually have to spend nearly \$200.00 to purchase other programs in order to get close to the power offered by SILK for only \$39.00 (suggested retail)!!!

But don't just take our word for it. Here's what industry experts are saying about SILK...

CORPORATE AMERICA SAYS:

The functions added (by SILK) include those that most people would have hoped for in Lotus, and a few that they've probably never thought of. —VERICOMP

Heavy corporate users are not going to switch to a new product without a very good reason for doing so. I think you've put together that reason in SILK. —NATIONAL ECONOMIC RESEARCH

...the user interface and functionality (are) clearly superior to Lotus 1-2-3. —IMPERIAL CORPORATION OF AMERICA

We're very impressed. The ability to simply allocate specific (resources) and automatically reallocate others is a great help. I'm very enthusiastic about SILK. —HOME EXPRESS

The single most important feature which SILK has to offer is that it is easy to use for beginners and yet it is powerful enough to satisfy the most advanced spreadsheet user. I feel SILK will replace Lotus as our spreadsheet package. —SHOPKO STORES INC.

(SILK) advances upon Lotus in some significant areas. I continue to believe that there is a significant market in the large corporate environment for a spreadsheet package that addresses the limitations in 1-2-3.

—GENERAL INSTRUMENT

...your product will appeal to the broadest range of business applications.

(SILK) is a very impressive product. —THE TRAVELERS

(SILK) is clearly a better product than Lotus 1-2-3. —WALDNER & ASSOCIATES

This spreadsheet is without a doubt the best I have ever seen.

—ON-LINE NETWORK SERVICES

THE MEDIA SAYS:

(SILK) offers distinct advantages over Lotus 1-2-3. —INFOWORLD

...for those interested in (SILK)'s

advanced functions such as

keystroke logging, goal-seeking

and time-series modeling,

there may be no choice at all.

—PC WEEK

... (SILK)'s "live" help is a

dramatic improvement in the notion

of context-sensitivity. This is a lot

of software for the money.

—THE SEIBOLD OUTLOOK

SILK's feature list is impressive.

One day, perhaps, Lotus will

release a spreadsheet with as many useful ideas and features.

—JACK MCGRATH'S Q/MAX

Feature for feature, SILK looks like a better spreadsheet than 1-2-3. "Nothing

runs as smooth as SILK," claim the ads and ... they may be right.

—PC MAGAZINE

(SILK) is a highly capable product, surprisingly refined for an initial release,

at a very reasonable price. —COMPUTER + SOFTWARE NEWS



Nothing Runs As Smooth As SILK.

SILK is designed for IBM PCs and compatible computers.

DAYBREAK
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2770 206th STREET, TORRANCE, CA 90501
1-800-327-SILK or 213-212-3030 (in CA).

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GOODBYE, IBM...



THANKS FOR THE MEMORIES

Have you ever noticed how time seems to change everything? Fashions change. Technology changes. Even the microcomputers we use change. Maybe that's why so many of our customers are saying goodbye to IBM in favor of a "good buy" from Wells American.

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THE A★STAR II IS MADE IN THE USA.



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The more advanced something is, the simpler it should be to use. That's exactly what we had in mind when we designed our new printer, the P321SL. It doesn't just look sophisticated, it makes turning your hard work into hard copy a lot easier.

The fanfold bypass feature eliminates the need to unload the continuous form paper when using single sheets. Just insert and print. The auto-load feature does away with platen cranking for both fanfold and single sheet paper. Just pull a lever to instantly and accurately load either of them. There's even a built-in tear bar to make tearing off the continuous

form paper at any point both neat and easy.

You won't be tearing your hair out trying to find and switch dip switches any-



more. There aren't any. The P321SL's front panel lets you choose type fonts, pitch, emulation, quiet mode, lines per inch, page length and more at the touch of a button.

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give you a lot to choose from. Without a lot of work.

There's another thing the P321SL gives you less of—options. That's because it comes with more standards like the tractor, quiet mode and IBM emulation.

Also standard is our excellent 24-pin print quality that's head and shoulders

This is Toshiba 24 pin letter quality.

This is 9 pin printer quality.

above 9-pin heads. (Made even better with Toshiba's letter-quality multistrike film ribbon.) And high-resolution graphics. So really the only other options to consider are the sheet feeder and larger memory.

That should make choosing the affordable P321SL as easy as using it. For the name of your Toshiba printer and computer dealer, call 1-800-457-7777.

1. IBM Proprinter is a registered trademark of International Business Machines Corp.
2. Qume Sprint 11 is a registered trademark of Qume Corp.



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Toshiba America, Inc., Information Systems Division

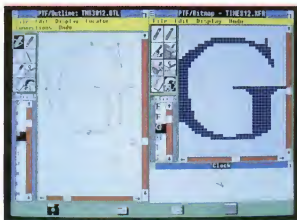
Tools Let Users Build Font Library

By Scott Mace

Zsoft Corp. has announced Publisher's Type Foundry, a \$495 program that lets users build font libraries, including Postscript-compatible outline fonts, from scanned and freehand bit-mapped images.

From a single scanned-image, users can build an entire font library of sizes and weights, said Mark Zachmann, company chairman. The fonts can also be downloaded for use on HP's Laserjet Plus, which is not a Postscript printer.

The program tools are a bit-mapped editor, an outline editor, and conversion utilities to link the software to input/output devices. The bit-mapped



Publisher's Type Foundry provides tools for creating customized fonts from scanned bit-mapped images for desktop publishing.

editor allows cleanup of fonts before printer or typesetter output. Characters can be moved to the outline editor for more modification.

The program, due to ship in the third quarter, runs under Microsoft Windows 2.0 and

works with Zsoft's PC Paintbrush and PC Paintbrush Plus. A PC AT with 640K plus 256K of expanded memory is recommended.

Zsoft Corp., 1950 Spectrum Circle, Suite A-495, Marietta, GA 30067; (404) 980-1950.

Thoroughbred Applications to Run on PS/2 Series

By Tom Moran

The Thoroughbred Software division of Concept Omega Corp. next month will offer ports of its Thoroughbred Basic that will allow existing applications to run on the IBM PS/2 series

under Xenix or MS-DOS, said Roger D. Sparks, vice president of marketing.

Because Thoroughbred Basic offers machine independence, users will now be able to run unchanged applications written in the language, Sparks said.

The single-user DOS version will cost \$495, and the three-user Xenix implementation will be \$895.

Thoroughbred will also make available a PS/2 version of its Thoroughbred operating system product that will initially support three users, according to Sparks. The operating system

drives the same applications with considerably better performance than Thoroughbred Basic under Xenix, he said. The new Thoroughbred OS should be ready in 90 to 120 days and will also cost \$895 regardless of PS/2 model, he added.

Further enhancements to the operating system should support up to 32 users on 386 machines by the middle of 1988, Sparks predicted.

Thoroughbred Software, Division of Concept Omega Corp., P.O. Box 1035, 102 Old Camplain Road, Somerville, NJ 08876; (201) 722-9565.

'Magic Mirror' Moves Data Between Files

Softlogic Solutions Inc. last week introduced Magic Mirror, an \$89.95 RAM-resident program that lets data be reformatted and transferred between incompatible PC applications.

To use Magic Mirror, the user invokes the program within an application and highlights the numbers or text to be transferred, Softlogic said. The highlighted pattern can then be saved for reuse.

The data are stored to a memory buffer, which is limited only by the size of the user's disk, and the user creates a style-control procedure so the data can be transferred into the target application's format. The procedure takes minutes to create and is stored by the software in a library of such procedures. Lastly, the user loads the target program and transfers the data.

Magic Mirror, available in June, works with all PC-compatible applications and requires an IBM PC or compatible with a minimum of 256K of memory and DOS 2.0 or later.

Softlogic Solutions Inc., 530 Chestnut St., Manchester, NH 03101; (800) 272-9900.

—Edward Warner

Program Stacks 3-D Images to Graphically Represent Data

By Jeff Angus

Boeing Computer Services next week will introduce Boeing Graph, a 64-color 3-D business graphics and charting program that features the capability to stack images for representation of 3-D or consolidated spreadsheet data.

The Boeing Graph package is designed to allow a single chart to graphically represent data plotted along three axes, a capability that Boeing spokesman Daniel Lees said the company believes is unique among current graphics products for the IBM PC.

The package displays 20 types of stacked 3-D images from 16 preset viewing angles, as well as 33 standard 3-D graphs and 16 two-dimensional types. Users can customize images by stretching or compressing scales and axes, rotating and distorting images, dictating label

size and location, and designating colors.

The stacked 3-D graphs provide a way to display results from multiple pages of data at the same time from 3-D spreadsheets, such as Boeing Calc, or from consolidations of 2-D spreadsheet products such as 1-2-3, according to Lees.

The Data Manager portion of Boeing Graph supports up to 15,000 rows, columns, and pages of 3-D information and uses a virtual-memory scheme that means Boeing Graph source files are limited only by the available hard disk space.

The package reads files in eight formats, including Lotus WKS and WK1, ASCII, DIF, 3DT, Syk, and Boeing Calc.

The \$350 program also prints graphs on supported printers to the maximum resolution the printer provides.

IBM Endorses Microsoft Windows Over Topview

By Edward Warner

Developers writing applications for IBM's coming Presentation Manager, the graphical interface in the next-generation operating system OS/2, should follow Microsoft Windows, not IBM's Topview, according to IBM.

Though IBM still calls Topview "strategic" and said last week the windowing environment will run under OS/2, an IBM spokesman said Windows is the better development environment.

"Windows, because it is written for a graphical user interface, is the obvious choice," said Marilyn Mobley. She said Topview and its applications will run under OS/2 as long as they do not exceed 16 megabytes of memory, OS/2's limit. She said OS/2 will support Topview because many users have developed Topview applications.

But even IBM's continued endorsement of the text-based Topview is not enough to justify continuing development in at least two firms.

Both Blue Cross and Blue Shield of Maryland, in Towson, Maryland, and the Amoco Research Center in Naperville, Illinois, say they have postponed their Topview development.

Blue Cross and Blue Shield have "moved away from writing to one environment" for lack of standards, said Peter Jansson, an internal consultant. IBM's support "is an interesting thing for us to tuck away, but right now Topview is an expensive add-on" that costs as much as \$174 per copy, he said.

Amoco Research Center may consider Topview again after

OS/2 ships, said PC technical coordinator Rosemarie Douglas. Amoco planned Topview development but delayed due to budget limitations and IBM's apparently limited support, said computer scientist Tim Walworth.

Utility Allows Laser Printer To Act as Plotter

Tangent Technologies has introduced PS Plot, a PC software utility that the firm said permits a Postscript-equipped laser printer to function as a plotter.

The \$50 package permits such PC CAD programs as Autodesk Inc.'s Autocad to output files on a laser printer, the vendor said. A laser printer can in some cases output a file 20 times faster than a plotter, Tangent reported.

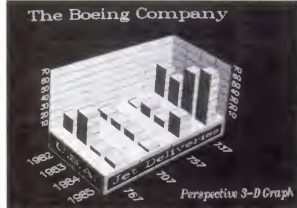
The software functions by converting Houston Instrument's DM/PL plotter language to Postscript, Tangent said. Included with the software is Laserscript/Plus, which permits text and graphics to be merged and reproduced. Laserscript/Plus lets programs such as Micropro's Wordstar output files to a Postscript printer, Tangent added.

Tangent Technologies, 5720 Peachtree Parkway, Suite 100, Norcross, GA 30092; (404) 662-0366.

—Edward Warner

Boeing Graph requires an XT, AT, or compatible with MS-DOS 2.0 or higher; 512K of RAM; at least 1.5 megabytes of

hard disk storage; and an EGA. Boeing Computer Services, Box 24346, M/S 7W-01, Seattle, WA 98124; (800) 551-0800.



The \$350 Boeing Graph package lets a single chart graphically represent data plotted along three axes.

News Briefs

Boca to Sell EGA Board for IBM PC Compatible

A \$199 EGA board for IBM PCs and compatible systems will begin shipping May 1, according to Boca Research Inc., the manufacturer of the board.

The board, called EGA by Boca, offers 256K of RAM, all the capabilities of IBM's EGA card, and backward compatibility with Hercules, CGA, and MDA, according to Pam Holly, a company spokeswoman. Based on Chips and Technology's newest chip set, EGA by Boca uses fewer components than other EGA boards, resulting in better heat dissipation and a decreased failure rate, Holly said.

Boca Research offers free technical support, a two-year warranty, and a fixed-fee replacement cost of \$65 for problems occurring after the two-year period, according to Holly.

Boca Research Inc., 6401 Congress Ave., Boca Raton, FL 33431; (305) 997-6227.

Idassociates Introduces 60-Megabyte Tape Drive

Idassociates Inc. has introduced Idea Tape, a 60-megabyte tape drive that is compatible with a variety of personal computers, including the Compaq Computer Corp. Deskpro 386 and the IBM PC, XT, and Personal System/2 Model 30.

Idea Tape, available in May, performs image-based backups at speeds of up to 4.7 megabytes per minute on a PC XT, the vendor claimed. It also permits multiple backups to be stored on one tape and allows image-based or file-by-file backups to reside on the same tape, Idassociates added.

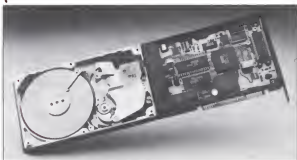
Besides image-based backup, in which all data on a DOS partition is duplicated at once, Idea Tape also offers file-by-file backup and automatic unattended backup, the vendor continued.

Also included is a scheduler which provides options for automatic backup. Idassociates added. An internal version of the product is \$1,695, while an external version is \$1,995.

Idassociates Inc., 29 Dunham Road, Billerica, MA 01821; (617) 663-8878.

Sony to Ship New Type Of Erasable Disc Drive

Sony Corporation will ship engineering samples of a new erasable optical disc drive



The \$1,195 Hardcard 40 from Plus Development Corp. provides 40 megabytes of storage with an average access time of 35 milliseconds.

Plus Development, Rodime Prepare Disks on Cards

By Edward Warner and Mark Brownstein

Plus Development Corp. today will announce a 40-megabyte version of its Hardcard, a PC expansion card that includes both a hard disk and a controller. Rodime Inc. also said it would soon ship a 45-megabyte disk drive on an add-in card.

The \$1,195 Hardcard 40 will work in all PCs and compatibles but is mainly intended for the IBM PS/2 Model 30. It offers 42 megabytes of formatted capacity and an average seek time of 35 milliseconds. The product, available now, has a mean-time-

between-failure rate of 40,000 hours, Plus added. The previous \$895 20-megabyte version will still be marketed, Plus said.

The R-Card 45, a single-slot 45-megabyte hard drive with a 28-millisecond access time, was recently announced by Rodime Inc. The new version of the hard card replaces an earlier R-Card 45, which was not compatible with the IBM PC AT or the PS/2 Model 30 computer, Rodime said.

The new card, which will begin shipping within the next two weeks, according to a company representative, will be compatible with the IBM PC, AT, and PS/2 Model 30. The card includes a connector to hook the drive directly into the system's power supply, avoiding problems that may result from sending power for the drive through the system bus. The R-Card 45's list price is \$1,495.

Plus Development Corp., 1778 McCarthy Blvd., Milpitas, CA 95035; (408) 946-3700.

Rodime Inc., Peripheral Services Division, 29525 Chagrin Blvd., Suite 214, Pepper Pike, OH; (216) 765-8414.

Acer to Unveil Laser Printer in 2nd Quarter

A \$2,595 laser printer that is compatible with Hewlett-Packard's Laserjet Series II will be available from Acer Technologies Corp. by the end of the second quarter, according to Acer, an affiliate of Multitech Electronics Inc.

Based on a Ricoh Corp. printer engine, the Acer LP-75 will print six pages per minute at 300-by-300-dot resolution and will run more than 500 applications designed for the Laserjet, Acer said.

The printer offers 1.5 megabytes of RAM, which is expandable to 2 megabytes, resulting in faster printing of graphics or text combined with graphics, according to Stephen R. MacKenzie, president of Multitech Electronics. The RAM capacity also allows the printer to produce a full page of graphics, he said.

The Acer LP-75 includes nine resident fonts and one font-cartridge slot, as opposed to the Laserjet Series II's two cartridge slots.

The new printer comes with a 12-month warranty, according to Acer.

Acer Technologies Corp., 401 Charcot Ave., San Jose, CA 95131; (408) 922-0333.

—Tom Moran

AST to Begin Shipping 10-MHz Speedup Card

Board to Include 16K Cache

By Mark Brownstein

AST Research Inc. will begin shipping a 10-MHz speedup card for 8088-based PCs and XT's by the end of May, according to AST Product Manager Genelle Trader. The board, which uses an 80286 processor to provide higher speed, also includes a 16K cache to further improve throughput, according to Trader.

The Hot Shot 286 is a half-size card that can occupy the half-slot in XT's or a full-size slot in any IBM PC, XT, or compatible. In order to install the board, the computer's 8088 processor must be removed and placed into a socket on a ribbon cable that plugs into the com-

puter's 8088 slot. The other end of the ribbon cable attaches to the Hot Shot 286. Trader described the installation process as simple.

The Hot Shot 286 board is shipped with software that allows the user to define a "speed switch" for toggling between the 10-MHz mode provided by the board and the standard 4.77-MHz speed that is available in a standard PC or XT. The board, which was not designed to replace the 8086 chip in some PCs, will have a list price of \$645.

AST Research Inc., 2121 Alton Ave., Irvine, CA 92714; (714) 863-1333.

Firms' Advanced LCDs Offer Near-CRT Quality

By Priscilla M. Chabal

Advanced liquid crystal displays that offer near-CRT quality with high resolution and less weight have been announced by Epson America Inc. and Image Displays Ltd. The primary use of the new LCDs will be in portable computers.

Epson recently announced the availability of two thin-profile, multitasking superwattens (STN) LCD displays using chip-on-flexible (COF) circuitry with either 640 by 200 or 640 by 400 resolution, according to the company. The LCDs include graphics capabilities and come in models with

violet dots on a gray background or black dots on a yellow background, Epson said.

The display's thin profile of 13 millimeters is due to the display mounting its driver on the outside of the display glass rather than directly on the back of the display glass. This mounting also permits backlighting for increased contrast.

A smart, high-resolution, lightweight display using Smectic A technology will be announced and demonstrated in the United States in June by Image Displays Ltd. of Harlow, England, said John Freer, director of the firm.

The display, about 1 inch thick with an 8-inch-by-10-inch active area, is capable of 1,000-line resolution and offers very high-contrast graphics capabilities and a 180-degree viewing angle, Freer said. Because the individual pixels are very stable, Smectic technology requires less power and eliminates complex multiplexing schemes to refresh the LCD.

"With the long-term memory stability, an image can remain on-screen indefinitely," Freer said. This results in an extremely good viewing contrast, he said. Image Displays expects U.S. production models to be available in the first quarter of next year.

Epson America Inc., OEM Products Dept., 3814 Kashiwa St., Torrance, CA 90505; (213) 534-4500.

Image Displays Ltd., Maypole Corner, London Road, Harlow, Essex, England CM17 9NA; (2) 792-9531.

AT&T, NCR Respond to Market, Cut Price of IBM PC Compatibles

AT&T and NCR Corp. both announced price cuts on their lines of IBM PC compatibles.

AT&T dropped the price of its PC 6300 with one floppy from \$1,780 to \$1,485; with two floppies from \$2,020 to \$1,565; and with one floppy and a 20MB hard disk from \$2,620 to \$2,165.

The PC 6300 Plus was cut from \$2,565 to \$1,590 for a single-floppy system; from \$2,790 to \$1,740 for two floppies; from \$3,215 to \$2,240 for a 20MB hard disk and a 360K floppy; from \$3,315 to \$2,340 for a 20MB disk and a 1.2MB floppy; and from \$4,340 to \$3,065 for a 40MB drive and a 1.2MB floppy.

The PC 6310's prices dropped

from \$3,045 to \$2,900 for a 1.2MB floppy; from \$3,995 to \$3,800 for the same floppy and a 20MB hard drive; and from \$4,995 to \$4,700 for a 40MB hard disk system.

NCR dropped the prices of its 286-based PC's and 8088-based PC's lines. A PC8 with a 1.2MB floppy and a 30MB hard disk dropped from \$4,990 to \$4,365. A PC6 with a 360K floppy went from \$2,240 to \$1,775; a two-floppy version was cut from \$2,390 to \$1,995.

AT&T, 1 Speedwell Ave., Morrisstown, NJ 07920; (800) 247-1212.

NCR Corp., Personal Computer Division, PCD-1, Dayton, OH 45479; (513) 445-7478.

—Tom Moran

Hardware and software for the business PC.

✓ denotes IBM-AT compatibility.
CP—copy protected; NCP—not copy protected

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Version numbers in our ads are current at press time

Alpha Software ... NCP	
Keyworks 3.0	\$59
AlphaThree 1.0	223
Ashion-Tale ... NCP	
D-Base II Plus 1.1	58
Framework II 1.1	58
MultiMate Advantage II	58
Borland International ... NCP	
Turbo Database 1.2	24
Turbo Graphics Toolbox 1.0	41
Turbo Editor and Toolbox 1.0	41
Turbo Lighting 1.0	58
Turbo BASIC 1.0	59
Sidewick 1.5	59
Eureka 1.0	59
Turbo C 1.0	59
Traveling Sidewick 1.0	43
Traveling Sidewick w/Sidewick	73
Reflex 1.1	87
Superkey 1.1	59
Turbo Pascal 3.0 w/BCD & 8087 support	59
Turbo Pascal w/Turbo Tutor	59
Turbo Prolog 1.1	59
Turbo Jumbo Pack	169
Breakthrough ... NCP	
Timeline 2.0	239
Broderbund ... CP	
Print Shop	35
Graphics Library 1	22
Graphics Library 2	35
Hyperbase Associates ... NCP	
SuperCalc 4.1.1	59
Crosstalk Communications ... NCP	
Crosstalk XVI 3.61	95
Remote 1.3	95
Dac Software ... NCP	
Dac Easy Payroll	45
Dac Easy Accounting	45
Executive Systems ... NCP	
X-TREE 2.0	34
5th Generation ... NCP	
Fastback 5.14	89
Generic Software ... NCP	
Generic CAD 3.0	69
Higraze Software ... NCP	
HyperACCESS 3.2A	89
Infocom ... NCP	
Cornerstone 5.2	59
Intersecting Concepts ... NCP	
Backup Master 2.01	59
Javelin Software ... NCP	
Javelin 1.1	139
Lifetree ... NCP	
Noisemaker Deluxe Plus 1.0	149
Quickwriter 3.1.0	67
Micro Education (MECA) ... CP	
Managing Your Money 3.0	115
Micropro ... NCP	
WordStar Professional Release 4	285
WordStar 2000 Plus Release 2	285
Microfilm ... NCP	
R-base System V 1.1	419
Base Graphics 1.0	159
Microsoft ... NCP	
Windows 1.03	239
Quick Basic 2.01	239
Multiplan 3.02	239
Projet 3.01	239
Windows 3.11	229
Bus Mouse 6.0 w/Show Partner	129
Serial Mouse 6.0 w/Show Partner	129
Base Graphics 1.0 (Windows and mouse)	369
Migent Software ... NCP	
Ability Plus	call

Monogram ... NCP	
Dollars & Sense 3.0	\$105
Neturkett Software ... NCP	
Slipper (Autumn '89)	399
Paperback Software ... CP	
VP Planner 1.3	57
VP Info 1.0	57
VP Expert 1.0	57
Personica ... NCP	
SmartNotes 1.4	49
Quarterdeck ... NCP	
DESQview 2.0	65
Softlogic Solutions ... NCP	
Software Carousel 2.0	35
Disk Optimizer 2.1	35
Software Publishing ... NCP	
PPS Personal Publisher 1.1	89
PPS First Choice 1.0	109
PPS Professional Writer 1.0	119
PPS Professional File 1.0	149
Harvard Professional Publisher 1.0	409
Springboard ... NCP	
Newscom-Pro	79
Symtec ... NCP	
Q&A 2.0	219
True BASIC, Inc. ... NCP	
True BASIC 2.0	59
Turner Hall ... NCP	
SOZI 1.5	49
Note It 2.0	59
4 Word 1.0	59
Cambridge Spreadsheet Analyst 2.02	59
WordPerfect Corp. ... NCP	
WordPerfect 4.2	239
WordPerfect Library 1.1	59

TRAINING

ATI ... CP	
SKILL BUILD PROGRAMS	
How to Use:	
DOS IBM PC: BASIC	each 33
TRAINING POWER PROGRAMS	
How to Use:	
Wordstar	each 43
Individual Software ... CP	
The Instructor II (intro to the PC)	26
Professor DOS	43
Tutorial Set (both items above)	49
Typing Instructor II	26
Training for Lotus 1-2-3 (for vers. 1A & 2)	37
Microsoft ... NCP	
Learning DOS (for any version)	33
Simon & Schuster	89
Typing Tutor III 1.5	17

HARDWARE

Manufacturer's minimum limited warranty period is listed at each company name. Some products in their line may have longer warranty periods.	
AST Research ... 2 years	
All boards listed include a FREE copy of DESQview	
SinAPack 384i (fully upgraded)	209
SinAPack Professional 256k (upgrades to 2 Meg)	call
Advantage Premium 512k	call
RAMpage! 256k (upgrades to 2 Meg)	call
RAMpage! 256 512k (upgrades to 2 Meg)	call
RAMpage! 256k and Premium Series boards support EMS and fully support EEMS	159
Amdek ... 2 years	
Video 410A Amber monochrome monitor	169
Port 722 (EGA compatible)	499
Curtis ... lifetime	
ACCESSORIES	
Printer Stand	18
Universal System Stand	25
Smartmodem to IBM Cable (9 pin to 25 pin)	17
Keyboard Extension Cable (3 to 9 feet)	27
Extension Cables for IBM Mono Display	33

SURGE SUPPRESSORS	
Diamond (6 outlets)	\$29
Emerald (6 outlets, 6 ft cord)	36
Ruby (6 outlets, EMF/RFI filtered, 6 ft cord)	55
DCA ... 1 year	
Imma (3270 emulation board)	729
Epson ... 1 year	
We are an authorized Epson service center	
EX-800 printer (80 cpi, 300 cps)	409
EX-1000 printer (136 cpi, 9-pin, 300 cps)	539
FX-96a printer (80 cpi, 9-pin, 200 cps)	349
FX-286a printer (136 cpi, 9-pin, 200 cps)	479
LX-96 printer (80 cpi, 9-pin, 120 cps)	189
LO-800 printer (80 cpi, 24-pin, 180 cps)	499
LO-1000 printer (136 cpi, 24-pin, 180 cps)	669
Everex ... 1 year	
Evercom II 1200 Baud Internal modem	119
Evercom II 2400 Baud Internal modem	199
5th Generation ... 6 months	
Logical Connection 256k	319
Hayes ... 2 years	
Smartmodem 1200 (w/Smartcom II)	39
Smartmodem 2400B (w/Smartcom II)	319
Smartmodem 2400B (w/Smartcom II)	479
Hercules ... 2 years	
Hercules Incolor Card	189
Hercules Graphics Card Plus	call
Inteli ... 5 years	
Above Board PS/286 512k S/P	469
Above Board AT 128k	354
Above Board 286 512k	349
Above Board PS-AT 128k S/P	379
Intelboard 386AT (req. cable)	114
8087 for IBM PC & XT	114
IntelBoard for IBM PC & AT 286	195
80287-6 for 8 MHz AT compatibles	249
Kensington Microware ... 1 year	
Masterpiece	99
Masterpiece Remote	114
key tronix ... 90 days	
5151 Keyboard (cable)	169
Migent ... 1 year	
Pocket Modem (ext., 1200 baud, w/software)	169
Mouse Systems ... lifetime	
PC Mouse with Pop-up Menu	59
BusPlus Mouse with Pop-up Menu	109
NEC ... 2 years	
Multisync (EGA compatible)	589
GB-1 Adapter (supports 640 x 480 res.)	369
NSI Logic ... 3 years	
SmartEGA (run Hercules on EGA display)	299
Orchid Technologies ... 2 years	
Turbo EGA	call
Tiny Turbo 286	call
PC Turbo 286 w/1 Meg	call
Jel-386	869
Orion Graphics ... 1 year	
MAX-12E Amber monochrome monitor	179
HX-12E (EGA compatible)	539
SMA ... 30-day money-back guarantee	
PC Document Keyboard Templates available for these programs and others:	
Lotus 1-2-3	call
dBase III	each 12
Toshiba ... 1 year	
PS21 31100 (90 column, 216 cps)	549
PS31 2 S/P printer (136 cpi, 288 cps)	949
Toshiba T1100 Printer Laptop Computer	call
Toshiba T3100 Laptop Computer	call
Tenng Labs ... 1 year	
EV-450 (supports 640x480 resolution)	369
Video 7 ... 2 years	
VEGA Deluxe (half height)	379

DRIVES

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70 Meg formatted capacity Int. Hard Drive for IBM PC or XT (w/WD controller & cables, 6 ft cable)	1069
70 Meg formatted capacity Int. Hard Drive for IBM AT (w/When Manager software, 28 ms)	997

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Bernoulli Box 40 Meg w/PC2 card	1949
20 Meg cartridge	79
Miniscribe Corp. ... 1 year	
ScribeCard 30 Meg (68 ms)	479
Mountain Computer ... 1 year	
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Drive Card 30 Meg (78 ms)	569
Seagate ... 1 year	
FREE PC TV+ Hard Drive Installation Tape with the purchase of either of the following Seagate drives for the IBM PC. Specify Beta or VHS	
20 Meg Internal Hard Drive (w/Western Digital controller and cables, 65 ms)	369
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TEAC ... 1 year	
PC XT 360k Drive (5 1/4" FD-55BII)	109
Tohshite ... 1 year	
PC XT 360k Drive (5 1/4" half height)	109
AT 360k Drive (5 1/4" half height)	117

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64k Upgrade Set (150 ns, set of 9)	call
256k Upgrade Set (150 ns, set of 9)	call

DISKS

All disks have a lifetime warranty	
DS/DD Disks for the PC & XT (40 TPI)	
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Maxell MD 2 (10 disks per box)	15
DS/High Density Disks for the AT (96 TPI)	
Fuge (10 disks per box)	24
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Maxell (10 disks per box)	27

CompuServe Information Service (subscription, manual, credit, publications)	24
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Hot

The single graphic solution.



Why read long articles and spec lists to figure out which graphics adapter is best for your EGA monitor? NSI Logic makes it easy. Because their Smart EGA lets you use any software, on any EGA monitor, in any supported mode. That means you don't have to give up Hercules-mode sharpness or speed for your monochrome software when you switch to EGA. And

you don't have to worry about compatibility with any new software you might want to use. EGA, CGA, MDA, Hercules? Now it doesn't matter. Smart EGA works with whatever display mode your software delivers. And it comes with a full three year warranty.

NSI Logic Smart EGA ... 3 years **\$299**

Look sharp!



Ready? You can now afford a laser printer. Come on. It's cheaper than a jacuzzi, and makes a better statement.

Naturally, before giving your dot matrix the old heave-ho (or second position in your printer hierarchy) you'll want to make sure you're buying a top-notch machine. Well, check out the Okidata Laserline 6 review in PC Magazine (4/28). Fifteen standard fonts, complete compatibility with Laserjet commands, great performance, and remarkable price.

Okidata Laserline 6 ... 1 year **\$1299**
 Personality Module \$159

Fast lane.



No, Virginia, you don't have to suffer the tedious wait time of your PC or XT any longer. The Mach 10 from Microsoft will double your speed (to 9.54 MHz) with a 16-bit 8086 microprocessor on a full-size board. Remember, this is Microsoft here. Full MS-DOS compatibility guaranteed. It's the ideal way to take advantage of the Windows multitasking environment without shelling out the big bucks for an AT. It's compatible with most popular applications software, and switchable so you can still use those older programs that can only run at 4.77 MHz.

Microsoft Mach 10 (includes Windows & mouse) ... 1 year **\$369**

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Say you've just finished developing some incredibly stunning graphics on your screen. Now how are you going to print it? Not just so it looks like some deranged bit map, but so it looks like what's on your screen—or even better. Pizzazz lets you rotate, enlarge, reduce, and position your screen art, in over 200 color tones (with a color printer, of course) or 50 grey tones/patterns (black and white). What you see on your screen, Pizzazz delivers on paper. And more.

Application Techniques
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Bernoulli Blowout!

Have you checked how much disk space you have left on your hard drive lately? Sobering, huh? Well, lighten up! It's bargain time again in Bernoulli land. Those removable cartridges will relieve you from the memory squeeze once and for all. These are the lowest prices we've ever been able to offer! These are new (not reconditioned) units.

Bernoulli Box 40 Meg ... 1 year **\$1949**
 Additional 20 Meg cartridges \$79
 Bernoulli Box 20 Meg ... 1 year **\$1549**
 Additional 10 Meg cartridges \$57

Note: our price includes the PC2 interface card, and we are an authorized Iomega repair center.

Draw the line.



Do you think of yourself as an artist? No? That's because you don't have GEM Draw Plus. It comes with a full range of line styles, colors, type sizes, and fill patterns. It puts rectangles, circles, arcs, and polygons at your fingertips, along with an extensive library of other useful bits of artwork. You'll be designing your own logos, layouts, legends, and label pins in no time. If you've been going to all the trouble to see it in your mind's eye, this is your chance to get it on screen.

Digital Research
 GEM Draw Plus 2.0 (not copy-protected) **\$189**

Chutzpah!



It takes an admirable amount of braggadocio to live on Lotus 1-2-3 like Silk has. This program offers enough significant advantages to make any hard (or soft) core spreadsheet user lane-chase. It's compatible with Lotus files, automatically validates all entries and records them on hard disk, and has a contest-sensitive help window. Dozens of other improvements, too. Take a look!

Daybreak Technologies
 Silk 1.0 (not copy-protected) **\$169**

Tip Sheet.



Name:
 Sharon Tobey,
 Sales

Claim to fame:
 Performs as "Jelly Beans" the clown (after hours).

It's time to do this column in "Dear Abby" style. Like: "Dear Sharon, everybody at work laughs at me because I haven't lost my PC yet. They all strut around with their super turbo charged AT's with megabytes of RAM and gigabytes of backup. How can I catch up? I don't have the budget for a whole new system. Signed... Just 256K." "Dear 256K," I would reply, "There are more ways to crank up your PC's speed and RAM than you can shake a hard card at. If you need speed, you can try Microsoft's Mach 10 card—far cheaper than a new system. Or, if you need both speed and memory, there are a number of possible solutions. First, think through what you really need, make a list of your current configuration and call me (or one of my erstwhile associates here). Office hours only, of course."

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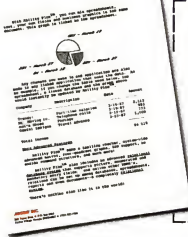
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News Briefs

Library Adds Datacomm Functions to Compiler

Silverware Inc. recently announced an asynchronous communications library for the Clipper compiler.

Silverware includes Hayes-compatible modem control functions, Xmodem file transmission and reception capabilities, a terminal program, and communications functions that can be called by an application.

Silverware requires Clipper Autumn '86 or later, an IBM PC, PC XT, PC AT, or compatible computer, and PC-DOS or MS-DOS, Version 2.1 or later.

The product is \$149.95 and is available now.

Silverware Inc., P.O. Box 781143, Dallas, TX 75378; (214) 902-0227.

Service Provides On-Line Access to Yellow Pages

Every Yellow Page directory in the United States is now available on-line, according to the Instant Yellow Page Service.

The service, which is accessible using any PC terminal with a modem, lets a user dial into a database and download information. Several selection options are available, including ZIP code retrievals and county selection.

Access is supported at 300, 1,200, and 2,400 bps, the company said.

The service costs \$95 for the first year and \$60 annually thereafter, plus a connect charge of \$1 per minute and 10 cents per name printed or displayed.

Instant Yellow Page Service, Division of American Business Lists Inc., 5707 S. 86th Circle, Omaha, NE 68127; (402) 593-4593.

'Connections' Newsletter Covers Interoperability

Advanced Computing Environments has started a monthly newsletter to discuss interoperability of computer systems.

According to the first issue, Connections will report on networking problems and track the work of standards-making bodies such as the International Standards Organization, which is defining the Open Systems Interconnect protocols.

Connections costs \$360 a year or \$240 a year for universities.

Advanced Computing Environments, 21370 Vai Ave., Cupertino, CA 95014; (408) 996-2042.

Firms With Minicomputers to Adopt PS/2 Slowly

Many Plan to Wait Until Networking Products Become Available

By Edward Warner and Sharon Fisher

Though information center managers can't yet connect IBM's new Personal System/2 with their corporate minicomputers, organizations with major investment in minis are nonetheless committed to adopting the new machines — albeit slowly.

At Bantam Books, in New York, where several Digital

Equipment Corp. VAX 8550s are operated in a cluster, director of systems Frank Zazo said his shop finds the PS/2 line attractive but will wait about a year before purchasing the machines. "We are not pioneers," he said. Bantam operates its PCs primarily in stand-alone mode.

Richard Kolm, director of MIS at Educational Broadcast-

ing Corp., in New York, said he wishes he could immediately obtain expansion boards to connect the new machines to his shop's eight System/36s and one System/38. IBM's System/36/38 Workstation Emulation Adapter will not be available until December. As a result, he said, "We either do without PS/2s until December, or we buy them and they can't function as terminals."

At the University of California, Berkeley, Ray Mader, assistant vice chancellor for information systems and technology, has placed an embargo on orders for the new machines until software is available that will let them communicate with Berkeley's other machines, including a Cray supercomputer. Most likely, required products will be Ethernet cards and software supporting the Transmission Control Protocol/Internet Protocol (TCP/IP), since most of the college's computers are Unix-based.

Stanford University, in Stanford, California, has similar plans, according to Raman Khanna, manager for the workstation integration group of network systems for Academic Computing and Information Systems. The university, which

has developed its own implementation of TCP/IP, plans to port it to the new machines. "It's the protocol we support throughout the campus, irrespective of vendor," he said. Many vendors will be putting out Ethernet boards for the PS/2, he said.

Other information center managers pointed out that emerging IBM networking standards may eliminate the difficulties of networking the PS/2 with any vendor's minicomputers. "Network interfaces for minis are moving to standards," said Peter Jansson, an internal consultant at Blue Cross Blue Shield of Maryland, citing IBM's Token Ring LAN and TCP/IP protocols.

Another major manager, in one department of a major New York bank where four Wang VS minicomputers are running, said he is not troubled that no network interface boards — other than those for Token Ring — have been announced for the PS/2. He said his bank will probably buy several PS/2s for use in stand-alone mode until an interface card for the Wang minicomputer becomes available. "We're just waiting for product the way System/36 people are waiting," he said.

Banyan to Improve IBM Compatibility of Vines

By Sharon Fisher

Banyan Systems Inc. plans to improve the IBM compatibility of its Vines network operating system and file servers and to add support for other systems.

Mark Kiron, director of marketing, outlined the company's plans at a recent meeting of the Association of Banyan Users International, a users group.

Banyan plans to make Vines compatible with IBM's LU 6.2 peer-to-peer communications protocol, beginning with a toolkit of functions written in C, said Carol Wolicki, manager of public relations. IBM's Document Interchange Architecture and Distributed Office Support Services will also be supported. Eventually, users will be able to manage the network with IBM's Netview.

Banyan also said it would support IBM's PS/2 computers as clients by the fall and, except for the Model 30, will support them as servers somewhat later. According to Wolicki, the company is developing a 386 version

of Vines, which will then be ported to the new machines. OS/2 and OS/2, Extended Edition will also be supported, she said.

Support for Transmission Control Protocol/Internet Protocol and Unix will be added in stages, beginning with release 3.0 — due this fall — Wolicki said. Banyan also plans to develop gateways to mail systems, beginning with MCI Mail, she said.

Wolicki said server capacities have been increased under Vines, Version 2.1, which is shipping now. The BNS server will be able to support up to 2 gigabytes, as opposed to the current 480 megabytes, while the DTS server will support over 700 megabytes, instead of 280 megabytes. Prices for the improved capacity, which will be available in the next month or so, have not been determined.

Banyan Systems Inc., 115 Flanders Road, Westboro, MA 01581; (617) 898-1000.

Ven-Tel Offers Modem Featuring X.PC and MNP Error Correction

Ven-Tel Inc. announced a Hayes-compatible, 2,400-bps modem that features both X.PC and MNP error correction.

The 2400-33 modem communicates both synchronously and asynchronously, allowing PCs to send data over a private or public telephone line. Users

can select either MNP or X.PC for each call. X.PC is used by commercial data networks, while MNP is mostly used for PC-to-PC communications.

The modem runs at 2,400 bps and adjusts to communicate with 300- or 1,200-bps modems.

The external version is available now; the internal version, a half-size card, will be available in 30 days. Both cost \$749.

Ven-Tel Inc., 2342 Walsh Ave., Santa Clara, CA 95051; (408) 727-5721.

— Lisa L. Spiegelman



Ven-Tel's 2,400-bps modem communicates both synchronously and asynchronously.

Program Performs File Transfer, Translation

By Laurie Flynn

A new program from Ungermann-Bass Inc. offers PC network managers consistent access to host computers while at the same time ensuring the security of the host data, the company said.

The Net/One Universal File Manager is a three-module software package that gives users of Ungermann-Bass' Net/One local area network the ability to transfer data to and from an IBM mainframe or DEC VAX or Hewlett-Packard minicomputer, and to then translate that data into a readable format, said Darrell Miller, director of marketing. While the file transfer and translation capabilities are already available using a combination of other products, the Universal File Manager combines them under one interface, he said.

"Everybody has learned that media really isn't the issue anymore," Miller said. "Instead, the issue is 'how do I get to those files?'" The program transforms a host file to Lotus 1-2-3 WKS or database format, for example, or to Syk format

for use in a Multiplan spreadsheet on a Macintosh, which can be connected to a Net/One network asynchronously. PC users can also access the printers of the host systems, according to Miller.

The Universal File Manager consists of Universal File Transfer software, which sits on both the host and the PC; the Universal File Transformer option, which sits on the host and translates data between PC and host formats; and the Universal File Administrator option, which sits on the host and allows an MIS manager to specify what host files can be accessed.

The Universal File Transfer ranges in price from about \$1,500 to \$7,000, depending on the host. The Transformer module costs from \$600 to \$3,000, and the Administrator costs from \$1,000 to \$4,500.

The programs were developed by Linkware Corp., a subsidiary of Ungermann-Bass, in Waltham, Massachusetts. Ungermann-Bass Inc., 3900 Frederick Circle, Santa Clara, CA 95052; (408) 496-0111.

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Novell Shipping Ethernet Adapter At Reduced Price

Novell Inc. said last week that it has begun shipments of its new Ethernet adapter card and that the price of the product would be \$100 less than previously announced.

The Network Ethernet NE-1000 adapter, previously called the E-Net card, costs \$395 instead of \$495 ("Novell to Add Features to Advanced Netware," February 23). The company has reduced the price to provide a lower entry point for Ethernet customers and to expand the network market overall.

"This effectively lowers the price for each networking workstation and should make networking, in general, more attractive to potential users," said Craig Burton, vice president of corporate marketing and development for the company.

The NE-1000 uses an 8-bit bus and features an 8K buffer. The half-size card includes an on-board transceiver and can run on either thick or thin Ethernet cabling. The card runs on IBM PCs, PC XT's, PC AT's, and compatible computers, Novell said.

Novell will continue to sell a \$595 Ethernet adapter card from Micom-Interlan, as well as cards from other vendors, the company said.

Novell Inc., 122 E. 1700 South, Provo, UT 84601; (801) 379-5900.

—Laurie Flynn

Net Group to Form To Define Tools On TCP/IP Wares

SANTA CLARA, CA — Users and vendors are forming a group that will define tools to manage TCP/IP products from multiple vendors.

The Network Management Working Group will develop a set of Request for Comments for network management tools on networks supporting Transmission Control Protocol/Internet Protocol (TCP/IP), according to Advanced Computing Environments (ACE), the consulting firm that is organizing the group's first meeting.

At this meeting, to be held at the Techmart Silicon Valley Marketing Center here tomorrow, the group will discuss the International Standards Organization and Institute of Electrical and Electronics Engineers Inc. models for network management, ACE said. (See "Vendors Plan TCP/IP Network Management," April 13.)

The group includes representatives from Ungermann-Bass Inc. here, Mitre Corp. of Bedford, Massachusetts; Excelan of San Jose, California; and Sytek Inc. of Mountain View, California, according to Subhash Bal, vice president of marketing for Excelan and a member of the group.

Advanced Computing Environments, 21370 Val Ave., Cupertino, CA 95014; (408) 996-2042.

—Sharon Fisher

Xedon Announces Voice-Response System for PCs

Xedon Inc. announced Voiceware, a PC-based voice-response system that can be customized for several different applications, including access to mainframe information via a telephone.

Voiceware is a turnkey voice-response automation system that includes a PC-compatible computer, software, training, and customization, Xedon said. Xedon customizes the Voiceware system and trains users.

Voiceware can be customized to allow callers to access voice mail or to place product orders via a Touch-tone telephone. Users can record responses on the system, and callers can select from the choices via the telephone keys, according to the company.

Also, the PC-based system can be used to run other MS-DOS software applications in addition to the voice-response applications.

Voiceware costs \$1,600 and is available now.

Xedon Inc., 69 Knollwood Road, Upper Saddle River, NJ 07458; (201) 825-2911.

—Lisa L. Spiegelman

Micom's Modem Runs at 2,400 BPS Over Phone Lines

Micom Systems Inc. introduced a small Hayes-compatible modem that runs at 2,400 bps over telephone lines.

The M3124EH-type M2 is less than 10 cubic inches in size and sends data asynchronously and synchronously. Although it can be used as a stand-alone modem for PCs, it is designed to be used in asynchronous terminals and printers.

The modem has MNP error correction and is compatible with CCITT V.22 bis, V.22, and Bell 212A, and 103 communication protocols. It is available now and costs \$499 for the modem and \$699 for the evaluation kit, required if the modem will be used as a stand-alone.

Micom Systems Inc., 4100 Los Angeles Ave., Simi Valley, CA 93062; (805) 583-8600.

—Lisa L. Spiegelman

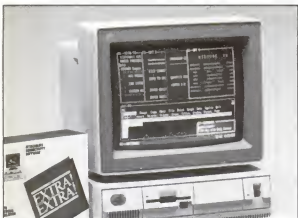
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Attachmate Corp.'s Extra supports up to four connections to a mainframe, as well as a PC session and a notepad.

Products Provide 3270 Emulation for PS/2 Line

By Jeff Angus

Attachmate Corp. will announce today a series of hardware and software products to provide 3270 emulation for IBM's new Personal System/2 line of computers, as well as for other MS-DOS machines.

Extra is a multisection workstation that conforms to standards for three kinds of connections: coax, Synchronous Data Link Control (SDLC), and LAN. The product also provides a common user interface to all three.

The program supports the hardware and software interface standards set for the PS/2, such as the High-Level Application Program Interface (HLAPI). Entry Emulator HLLAPI (EEHLLAPI), and Server Requester Programming Interface (SRPI). "APIs are the second generation of terminal emulation," said Michael New, vice president of marketing for the company.

Extra supports up to four mainframe sessions and host graphics. Three main-frame file transfer standards — TSO (Time Sharing Option) Text Editor, IBM Send/Receive, and IBM DISPOSS PS/370 — are supported.

The software supports all Attachmate and IBM coax adapters. The company also plans to support Irma coax adapters from Digital Communications Associates Inc.

The product requires less than 128K of memory and will be available June 1 for \$425. A volume purchase plan and site licensing is also available. A host graphics option, which turns a PC into an S3G graphics terminal without a special graphics adapter, costs \$395.

Extra Entry-level is a lower cost version with a subset of features, including the IBM Send/Receive file transfer, EEHLLAPI, and connection via coax or through a LAN. Extra Entry-level will be available June 1 for \$275.

Attachmate also unveiled the

3270 Gateway option, which will be available in August for \$50. The software package gives PCs on any Netbios-compatible LAN a way to talk to a mainframe host. The gateway PC can communicate with the host via a coax or an SDLC connection.

The firm also introduced three hardware adapters, which will be available June 1. The 3270 Coax Adapter costs \$570 and links a PC to an IBM 3174 or 3274 controller. The adapter is compatible with the IBM 3278/79 Emulation Adapter and with DCA Irma adapters. The half-length SDLC Adapter costs \$270 and supports external synchronous modems at rates of up to 19,200 bps. The SDLC/Autolink Adapter costs \$1,570 and provides a 4,800-bps synchronous modem and an autodialer on a full-length card.

As part of the introduction of the Extra line, the company also said the adapter cards and software options available in the existing product line are now unbundled, which allows a user to choose software and hardware functions separately.

Attachmate Corp., 3241 118th S.E., Bellevue, WA 98005; (206) 644-4010.

Tool to Display Token Ring Events

By Laurie Flynn

A management tool for Token Ring networks has been developed, using components of the Macintosh II fitted with a token ring adapter card to provide network managers with a graphical representation of events on the network.

The Lanscope Data Management Terminal (DMT) uses the Mac II's 16-MHz Motorola 68020 microprocessor as well as its user interface, said Network Intelligence Ltd. Partners.

The Lanscope DMT allows users to view graphically the source of a fault on the network, providing real-time statistical reporting on the performance of network devices, the firm said.

The product uses the same bus structure as the Mac II, for which the company has developed its own adapter card that enables users to put the modified Macintosh on a Token Ring

network, said Ken Bennett, vice president of marketing and sales. The bus plane, designed by Network Intelligence, features 13 expansion slots, so multiple LANs can be monitored.

The company selected the Apple components primarily for the user interface, which it said will make the product appealing to users of complex, multiple-ring networks. "What people buy when they look for network management is ease of use," said Bennett. "It's not a Macintosh we're building, we're just interested in the user interface. Right now most people are buying Suns to be able to run multiple windows." The products are intended for network managers, systems integrators, and developers, he said.

The product line consists of a network management console,

the Token Ring Manager, and a wiring concentrator. The products in the line include a 20-megabyte hard disk with an optional 40-megabyte drive, and one 800K floppy.

Network Intelligence Ltd. Partners Inc., 17 Ballard Way, Lawrence, MA 01843; (617) 681-8403.

Woolf Adds New Features To 'Move-It'

Woolf Software Systems Inc. has upgraded its Move-It communications program, the company announced.

New features of Version 4.02 include automatic file conversion, support for the Xmodem and Xmodem-CRC protocols, Xon/Xoff support, and scripting files, said Jeff Woolf, president of the company.

Future releases will support the Compuserve-B, Kermit, and Ymodem protocols, Woolf said.

Version 4.02 is available now for the IBM PC, PC XT, PC AT, and compatible computers for \$150. Users of Version 3.0 can upgrade to the new version for \$60, Woolf said. Versions for Fujitsu computers and Digital Equipment Corp.'s Rainbow personal computer are under development, he said.

Woolf Software Systems Inc., 22048 Sherman Way, Suite 106, Canoga Park, CA 91303; (818) 703-8112.

— Sharon Fisher

CXI Reduces Prices on Boards, Software With User Trade-Ins

By Sharon Fisher

Users of any micro-mainframe board can trade it in to CXI Inc. for a new PCOX board and software at reduced prices, the company announced.

The boards will cost \$275 each with a trade-in. In addition, each person trading in a board can buy a PCOX software package at a special price, such as \$100 for a single-station product, \$50 for file transfer or windowing software, and \$500 to \$800 for LAN workstation software. Normally, the board and software combinations would cost users \$895 or more, according to the company.

CXI offers four kinds of boards and about 20 software packages that include features such as terminal emulation, support for multiple host sessions, and compatibility with IBM's 3174 controller, accord-

ing to a company spokeswoman. Older CXI boards are also eligible for the trade-in program.

The company has not yet determined how long the program will be in effect, the spokeswoman said.

CXI was purchased by Novell Inc. of Orem, Utah, in March.

CXI Inc., 1157 San Antonio Road, Mountain View, CA 94043; (415) 969-1999.

Software to Let Windows Programs Run on PCs Linked to Appletalk Nets

Tangent Technologies is developing software that will allow Windows applications to run on IBM PCs connected to Appletalk networks.

With Winprint, users of an IBM PC equipped with Tangent's PC Mac Bridge/ATB or Apple's Appletalk card for the IBM PC can run programs written for Microsoft Windows. Primarily, this capability will allow Pagemaker and other IBM PC desktop publishing programs to access Laserwriters across an Appletalk network, according to Guy Miranda, vice president of sales and marketing at Tangent. The new program will "turn Windows applications into network programs," he said.

The \$300 product consists of a board and software, though users already equipped with either Apple's or Tangent's Appletalk board for the IBM PC can buy the software separately for \$79.95.

Tangent Technologies, 5720 Peachtree Parkway, Suite 100, Norcross, GA 30092; (404) 662-0366.

— Laurie Flynn

Firm Announces Windows-Based E-Mail Program

By Laurie Flynn

Da Vinci Systems Corp. last week formally announced the first Windows-based electronic mail program, designed to run on IBM Token Ring Networks.

Da Vinci Systems Email is a \$99-per-workstation mail package. (See "Da Vinci Readies Windows E-Mail Program for Use on IBM Token Ring," October 13, 1986.) Instead of using a server with a directory, users maintain mail files on their own hard disks. This provides greater security and flexibility, said Chris Evans, vice

president of marketing.

With Email, users can read their mail from within applications and can attach DOS files or the Windows clipboard to a message before forwarding it.

Email's Post Office feature, the mail routing portion of the program, enables users to exchange mail with remote networks and manages messages for users that are not on-line. The Post Office costs \$250. A version of the program for use with OS/2 is under development, Evans said, and will be

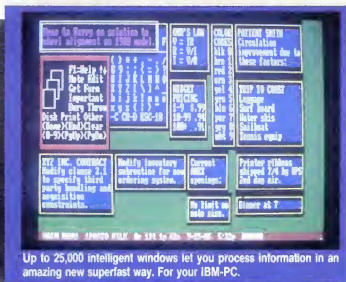
released at the same time as the new operating system.

Da Vinci will also offer gateways called Enhanced Function Modules that let users log on to other systems, Evans said.

Da Vinci Systems Email will be available in 90 days and will run on 3Com Corp.'s TokenLink network as well as on the IBM Token Ring. Evans said. A DOS version for non-Windows environments will also ship.

Da Vinci Systems, P.O. Box 5442, Raleigh, NC 27650; (919) 839-2000.

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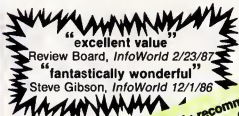
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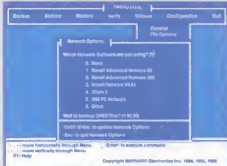
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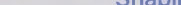
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News Briefs

Buyers of Powerpoint To Receive Smartscrap

Purchasers of Forethought Inc.'s Powerpoint program will receive a special version of Solution Inc.'s Smartscrap desk accessory, the developers said.

Powerpoint, described as a "desktop presentation" package, is designed for creating 35mm slides, flip charts, speaker's notes, and audience handouts permitting all the required materials for a presentation to be generated from a single program. With Smartscrap, users can locate individual slides and copy all or part of each slide into other Macintosh programs, according to Solutions Inc.

The version of the program packaged with Powerpoint is said to include features not available in the standard version, including a pictorial table of contents, which makes it easier to locate specific pictures held in a scrapbook; support for multiple scrapbook files; and a scrollable window for viewing large pictures, Solutions Inc. said.

Solutions Inc., P.O. Box 989, Montpelier, VT 05602; (802) 229-0368

Print Spooler to Allow PC/Mac Access on Nets

Tangent Technologies will ship in July a print spooler that enables Macintosh and IBM PC users to access a Laserwriter across an AppleLink network.

PC Mac Spool turns an IBM PC or compatible into a dedicated spooling device on the network, according to Guy Miranda, vice president of sales and marketing at Tangent. The PC appears onscreen as if it were the Laserwriter.

The program costs about \$500. Miranda said he expects people to use inexpensive PC clones as the spooler device, making the product price competitive for a network of users.

A version of the program supporting IBM's new Personal Pageprinter is under development, according to Miranda.

The company also said it will ship next week its Tangentshare program, software that allows a personal computer on an AppleLink network to share files across an Apple's Appleshare network file server.

Tangent Technologies, 5720 Peachtree Parkway, Suite 100, Norcross, GA 30092; (404) 662-0366.

Apple Restates Commitment to Token Ring Link But Net Vendors Have Yet to Announce Compatible Products

By Laurie Flynn

Apple is committed to integrating Macintoshes into IBM Token Ring environments once IBM has sufficiently established the network, company chairman John Sculley reaffirmed last week.

But neither Apple nor most traditional network vendors have formally announced any products to directly connect Macs to IBM's Token Ring.

Most of the vendors said they want to gauge the impact of the new Macintoshes before delivering compatible token ring products. Vendors also said software complexities would impede quick connection of the Apple machines to the IBM network.

But Apple said it was well-positioned in the token ring market. "What we need is to have IBM get Token Ring firmly established, which we are

supporting, and that gives us access into the IBM world," said Apple chairman John Sculley, who spoke at the Hambrecht & Quist Technology Conference in San Francisco last week. "One of the positioning advantages that we think we can have over IBM is that we are targeting a multivendor environment, whereas they are primarily targeting bringing integration across their own product lines."

At least one company has already developed a token ring network card for the bus structure of the Macintosh II. Network Intelligence Limited Partnerships of Lawrence, Massachusetts, developed such a card in order to use components of the Mac II, which it licensed from Apple, as the core of its token ring monitoring tool. But the company does not offer the

product in a way that would connect ordinary Macintosh IIs as workstations on a token ring network, the company said.

"Realistically, you could use our hardware to put Macs on the network, but you wouldn't have the software protocols to make it run," said Ken Bennett, vice president of sales and marketing at Network Intelligence.

3Com Corp., whose Ethernet card for the Mac II that Apple has announced it will sell under its own label, said it expects to see little demand for Mac-to-token ring connections for some time. "It's at least a year away, and that's assuming IBM shops begin to want them," said Bridget McNiel, who heads 3Com's token ring development efforts.

One vendor that has announced plans for Macintosh token ring support, Novell Inc., said it will do so in a future release of the Netware network operating system as part of its Universal Network Architecture (UNA). In the UNA scheme, Netware will be able to link different systems together, regardless of media.

But many vendors said that task is a formidable one.

"Just because you put a Mac on a token ring doesn't mean you can be a part of an IBM environment," said Craig Burton, Novell's vice president of corporate marketing and development. "Token ring is just one of the physical media that's popular. Software's the hard part."

There are several possible ways of connecting Macintoshes to token ring networks, said Nat Goldhaber, president of Centram Systems, publisher of the Tops network. The difference lies in what protocols the network will "speak," he said. Running Appletalk over the token ring transport mechanism is fairly straightforward, similar to what exists now for Ethernet networks. To put Macs on a token ring network running the SMB protocols, used in PC networks, would be a more difficult task, requiring a mechanism to translate the Mac network calls, he said.

Rachel Parker also contributed to this story.

Mindwork To Upgrade Mindwrite

By Rory J. O'Connor

A faster, more expensive version of the Mindwrite word processing package will be released this month, according to maker Mindwork Software.

Version 1.1 of the package, first released last November, will also fix bugs reported by users in the first version, according to vice president Susan Raab. In addition, the new version will also include support for the Appleshare file server.

But the price of the product, which is centered around an icon-based outline processor, will also more than double from its current \$125 to \$295.

Raab said the price increase was due in part to the company's repositioning of the product, which it now wants to sell to professionals who write but who

aren't necessarily responsible for the final production of documents.

"The \$125 price was molded with the premise that this would be the replacement for Mac Write for people who also wanted a Thinktank-style outliner," Raab said. "But this was a year ago, and now users have a great many word processing programs to choose from, and their mindset seems to be on page layout and design. We're looking instead for the content expert."

The performance enhancements in Version 1.1 include faster typing response that reduces typing-ahead delays, Raab said. It also supports large-screen monitors and fixes problems the earlier version had with certain screen update procedures. The package will include an automatic back-up feature as well as support the Mac Lightening spelling checker and thesaurus from Target Software of Miami, she said.

Mindwork Software, 100 Pacific St., Suite 555C, Monterey, CA 93940; (408) 375-1531.

Mac-to-VAX Software To Run on Several LANs

By Scott Mace

NASHVILLE, TN — White Pine Software has announced that its family of Macintosh/VAX connectivity products will soon run over popular LANs in addition to asynchronous lines.

The first networks to be supported include Apple's Appletalk and Corvus Systems' Omninet. White Pine said at the Dexpo South show here.

A direct Macintosh connection to Ethernet will be supported later in the year, said Samuel Solon, president of White Pine Software.

Currently, the company's Macintosh/VAX products require use of asynchronous communication lines, such as modems and RS-232 cable. (See "New White Pine Software to Link Macs, DEC VAX," January 5.)

Network access will be provided via a standard Mac240 terminal emulator package (Version 2.0) and special network drivers from White Pine Software and other companies.

Connecting an Appletalk network to the VAX will require Fastpath, a \$2,500 Appletalk-to-Ethernet hardware device from Kinetics Inc. of Walnut Creek, California.

Individual Macintosh VAX workstations can be connected

to Ethernet via Ether-SC, Kinetics' \$1,250 device that uses the SCSI port of the Macintosh Plus.

Alisa Systems of Pasadena, California, will provide the driver necessary to connect Mac240 with Alisatalk, a VAX-based software program implementing Appletalk protocols on Ethernet, Solon said.

That driver is provided as one of several terminal options for Alisatalk, said Robert B. Denny, president of Alisa Systems.

Mac240, which runs on the Macintosh, sells for \$199. It permits movement of text between Macintoshes and VAXes, movement of VAX graphics to the Macintosh, and program access from Macintoshes to VAXes. V-Macs single-user sells for \$399, and V-Macs multiuser sells for \$999.

Another White Pine product, Reggie, has been delayed and will ship in a month, Solon said. Reggie, which was originally supposed to ship in January, allows graphics communications from the Macintosh to the VAX and DEC peripherals.

White Pine Software Inc., 94 Route 101A, P.O. Box 1108, Amherst, NH 03031; (603) 673-8151.



Mindwrite, Version 1.1, will be available this month; Mindworks said the update will fix bugs and operate faster than the original.

Repeater Box Said To Double Range Of Network Macs

A repeater box that reportedly doubles the cable distance between Appletalk-linked Macintoshes was released by Lutzky-Baird Associates last week.

The amplifier, called the LBA Repeater Box, can extend the total distance of Appletalk cable in a single network to 3,000 feet, the company said. Adding additional Repeater Box units increases the distance another 1,500 feet, up to a maximum of 7,000 feet with four of the devices, the company said.

Using one of the devices, individual

Macintosh computers on the network can be located up to 100 feet apart, double the current practical limit of 50 feet, said Leland S. Kollmorgan, chief operating officer.

The company said the product is intended for use in large corporate offices that must connect many Macs together over distances. The company said the device could theoretically be used to increase the number of individual Macs on a single network above the maximum 32, but said performance limitations prevent it from recommending it.

The LBA Repeater Box is supplied with two Appletalk cables and is priced at \$249. The company said the product is immediately available.

Lutzky-Baird Associates, 23801 Calabasas Road, #2011, Calabasas, CA 91302; (818) 347-7791.

'Fourth Dimension' Database Slated for Summer Release

By Rory J. O'Connor

Buyers should see this summer the 4th Dimension database, formerly codenamed Silver Surfer, according to the new president of the U.S.-based company marketing the package.

The company, Acius, will also develop a number of developer support programs modeled after similar programs at Apple, according to Guy Kawasaki, who recently left Apple to head Acius. Among them will be a certified developers' program to support the creation of vertical-market applica-

tions written in 4th Dimension's sophisticated programming language, and liaisons with users groups and dealers to educate them in the intricacies of the product, he said.

But Kawasaki cautioned that the company's support efforts for customers writing their own programs in the language, as well as for developers, would develop slowly. "I fully realize that the need is to build up the support infrastructure, that's the key now," he said. "But we want to carefully bootstrap."

Kawasaki said Acius' target buyer is the very high-end database user, who he said will create applications used by others. "The average user gets the most powerful database on personal computers, but the buyer will get it for control," he said.

The relational database's 1,200-page manuals are being readied for printing now, Kawasaki said. The price of the package will be \$695.

Acius, 20300 Stevens Creek Blvd., Suite 495, Cupertino, CA 95014; (408) 252-4444.

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Eurosoft to Offer VMS Virtual File System for Mac

By Laurie Flynn

Eurosoft said it will offer in June a VMS version of its Macintosh virtual file system, as well as an enhanced version of its Mac-to-Unix program, Mac Nix.

The VMS version, called Makeasy, will offer users the same functions as Mac Nix, but for DEC computers using that operating system. Both programs are icon shells and virtual file systems. One module runs as a process on the host, and one module runs as an application on the Macintosh.

Like Mac Nix, Makeasy will come in two versions. A serial version will be available for terminal connections, and an Appletalk version will be available for Mac users on an Apple network.

Makeasy will cost about \$295 per user, with discounts after the first copy. When users are added, the customer buys installation software for the host that enables additional users to connect simultaneously.

Version 3.0 of Mac Nix, also available in June for \$295, will feature multitasking and multiple windows. Users of the current product can upgrade for about \$50.

Mac Nix has been available since November 1986, according to Bill Sullivan, Mac Nix product manager. He said that sales have picked up since Apple took the wraps off its Unix strategy when users realized it would take longer than originally expected for Apple's Unix connection.

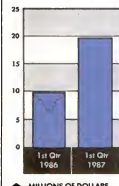
"With Mac Nix we give the Mac user interface for Unix hosts," said Sullivan. "We're making sure we're offering everything that Apple isn't offering."

Eurosoft International Inc., 14082 Loma Rio Drive, Saratoga, CA 95070; (408) 741-0739.

News
BriefsApple's Shareholders
To Get Cash Dividend

Apple Computer recently announced it would distribute a cash dividend to shareholders, a move it described as a vote of confidence in its continuing strong sales. With more than \$700 million in cash, Apple believes the 12-cent-per-share dividend will also help increase its credibility within the business community. "This very clearly separates Apple from the other companies, which are not able to do this," said Apple CEO John Sculley, speaking at the Hambrecht & Quist Technology Conference in San Francisco last week.

Apple also announced a two-for-one stock split, effective June 15. The company's stock has been trading at around \$75 per share, a price Apple believes may limit the number of potential investors. Apple shareholders as of May 15 will be issued two shares for every one they currently own, according to the company.

WORD PERFECT
DOUBLING SALES

Word Perfect Corp. is entering a 100 percent growth rate, which means it should clear \$100 million in revenues during 1987. With sales climbing into significant numbers, Word Perfect's profits are growing, exceeding 50 percent for the month of March, according to Andre Peterson, director of PC products. To fend off competition from the likes of Ashton-Tate, Micropro, and Microsoft, the privately held publisher is increasing research and development efforts to bring out new products during the summer months, said Peterson.

• PROFILE

Zenith Chases Compaq
In PC-Compatible Sales

Firm to Broaden Product Line

By Scott Mace

After working to establish itself in the personal computer business, Zenith has its eye on snatching the No. 2 manufacturer of IBM-compatible personal computers.

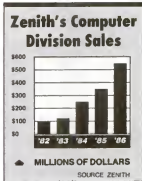
Early this year, Zenith embarked on its challenge — to rival Compaq Corp., which some statistics show as the current No. 2 manufacturer of IBM compatibles. Zenith's recently announced products, including the Intel 386-based Z-386 desktop PC, the Z-183 laptop with an internal 10-megabyte hard disk drive, and the first flat tension mask (FTM) CRT (See "Flat Tension

Mask Improves Zenith Monitors' Capabilities." April 20, were planned to take Zenith into new markets.

Already, the FTM has caught the industry's attention, according to Zenith. "One of our guys walked into an Inacom store recently, and the store sold six FTMs without knowing price, model number, or delivery dates," said director of marketing Andrew Czernek. To date, three major distributors have agreed to carry Zenith's FTM monitors, which just happen to match the specs of IBM's PS/2 monitors, he added.

The company is also working on a raft of new products, from a ruggedized PC for industrial settings to a downsized 286-based system and a home computer. These products will help Zenith diversify its customer base. "McDonald's approached us recently," Czernek said. "You don't think of that as a factory, but it requires an industrial PC."

The smaller 286-based machine, tentatively scheduled for a July introduction, has been hampered by problems in gate array technology, Czernek said. "It's 18 months behind schedule

U.S. Court Finds States Exempt
From Software Copying Suits

By Scott Mace

States and their agencies cannot be sued for illegally copying software or other copyrighted materials, according to a recent court decision.

In July 1986, BV Engineering of Riverside, California, sued the University of California, Los Angeles through its directors, the Regents of the University of California. In the suit, BV Engineering alleged that UCLA allowed unauthorized copies of BV statistical and scientific software for the IBM PC to be made and used.

In mid-April, Judge Harry L. Hupp of the U.S. District Court for the Central District of California dismissed the complaint, saying the 11th Amendment to the Constitution protects states from being sued under federal law. The only exception, Hupp said, is if the law specifies that states can be sued under that law, a provision not found in current copyright law.

The Software Publishers Association said it would support BV Engineering's appeal of Hupp's decision. "This decision

effectively places all copyright holders at risk with respect to the states," said SPA executive director Kenneth Wasch.

"Either the District Court decision must be overturned on appeal, or the Copyright Act must be amended," Wasch said. The decision does not give state employees free reign to illegally copy software, according to Allen Wagner, university counsel for the University of California. "Copyright infringement is done by individuals, and they are still amenable to suit in federal court."

The infringing copies were collected when the suit was filed and are not in use anymore, Wagner said. "We were trying to appease them, but BV Engineering wanted monetary damages," he said.

Wagner said the decision protects state agencies from suits that could drain the public coffers. Instead of suing — and seeking large damage awards — publishers will have to seek injunctions to control unauthorized copying, he said.



Zenith's computer division has made a name for itself in the laptop market, landing lucrative contracts with government agencies. But president Robert Dilworth stresses that desktops are Zenith's "bread and butter."

because every time we do the gate array, it comes out with compatibility problems."

Zenith agrees with Compaq that IBM has abandoned its own industry standard with the PS/2. For Zenith, IBM's move presents an opportunity to continue developing products that adhere to the standard followed by more than 9 million PCs. For instance, Zenith is also doing much research on a home-oriented product that will go "two steps further" than IBM's new PS/2 in ease of setup and use, Czernek said.

The most significant new development in the Personal System/2 was the Micro Channel bus architecture, which Zenith will be evaluating in coming months, Czernek said.

In the meantime, business is booming. In the race with Compaq, Zenith's computer division narrowed the gap in 1986 with sales growing to \$548 million compared with Compaq's \$625 million. In the current healthy climate for PC makers, Zenith may surpass Compaq this year.

"Zenith will certainly exceed the most conservative estimates for Compaq's 1987 revenues, but Compaq may still nose ahead," said James Magid of Magid Research, in New York.

Indeed, Compaq's financial results for the first quarter show it growing at 47 percent. Continued strong demand for the Deskpro 286 and Deskpro 386, as well as eager Portable III buyers, earned the company more than \$210 million in revenues during its first quarter, topping analysts' projections of \$200 million.

Much of Zenith's growth can be traced to its successful government bids. Last year, Zenith won a three-year armed services contract for Z-248s, an award that may very well go well beyond the 90,000 units originally bid for, Czernek said. In less than one year, most of the 90,000 units have been shipped, indicating that Zenith may ultimately ship three times that number, he said.

The high production volumes have enabled Zenith to reduce its costs further by manufacturing more of the components in-house, such as keyboards. "We knew what we were doing" when bidding the Z-248 at low cost, Czernek said.

Zenith has also won recognition in the laptop market. Last year, amid wild speculation about IBM's unannounced laptop, Zenith was awarded the IRS' contract for 14,000 Z-171 laptops. In the commercial arena, strong demand has resulted in a 30-day waiting list for the Z-181 portable. Despite this success, Zenith president Robert P. Dilworth rejected the assertion that Zenith is turning into a portable computer company. "Our bread-and-butter products are still desktops," he said.

Based in Glenview, Illinois, Zenith Data Systems may seem removed from both Silicon Valley and the Route 128 technology centers. But Dilworth is anything but isolated, jetting between California, Glenview, and Zenith's assembly plant in St. Joseph, Michigan. Even when socializing at a recent West Coast Computer Faire, Dilworth was looking for technology to integrate with Zenith's products.

"We're a pretty aggressive group," Dilworth said. "There's a mentality at Zenith that's willing to accept that a PC can be sold as a commodity. We'll chase to get the best price, best labor rates, best experience."

Zenith may move in some surprising directions in the next year. Czernek hinted that the firm could be the first AT-compatible maker to ship Microsoft's OS/2. He also suggested that Zenith is not entirely pleased with Microsoft Windows and may release a new user interface in 1987.

Such technical expertise may help Zenith win an Air Force bid for 90,000 laptops. "My guess is Zenith will continue to win those contracts," said Terry Miller, president of Government Sales Consultants, in Great Falls, Virginia.

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Tech Street

By John Gantz

Will Corporations Buy IBM's New Technology and Dump Old Architectures?

It's been a quite good week for thinking about cataclysmic change for our industry. So many things have been happening lately of such immediate topical interest that the forest is being obliterated by the trees.

There's the bizarre suit against Lotus, of course, that if prosecuted to conclusion and found for the plaintiffs would cause that venerable company to disappear. In case you missed it, the directors of the old Software Arts — not founders Frankston and Bricklin — are suing Lotus and claiming that 1-2-3 is a rip-off of Visicalc. I guess if everything is collected, including punitive damages, we're talking \$900 million.

Then there's the mathematical short circuit in the Intel 80386 chips that will force a recall of computers and probably delay the PC/2 somewhat. Egad.

Finally there's the PC/2. IBM's megabucks ads have been catching a lot of attention at the same time clone makers are counting with chagrin the number of proprietary components in the Model 80. The announcement has been picked apart and analyzed six ways from Sunday in the last few weeks. The consensus? No big changes until after OS/2 Extended Version comes out.

So what's all this about cataclysmic change? Well, here's the input that has

put me on this radical track:

- Taking part in a forum of major telecommunication managers this week, I learned that all five on the panel are looking to take their network management function inboard to their IBM mainframes. These are managers of multimillion dollar networks with all sorts of complex switching gear, including T-1 multiplexers, large PBXs, fiber-optic lines, and very small aperture satellite earth stations. Where they manage their networks from tells something about how they expect their data and voice traffic needs to develop.

- A friend of a friend clued me in to an upcoming contract by one of the Fortune 500 service companies for enough LAN (token ring) gear and terminals to make your head swim: well over \$100 million. This was not an isolated case — companies are planning major upgrades of office systems that include plenty of LAN hardware and application ties to central transaction and database networks.

- A small business system reseller of IBM personal computers and Wang minicomputers told me of conversations he'd had with a clone maker salesman — in which sweat dripped from the salesman's brow and hairs turned gray as he watched.

- Even as last week's Tech Street

column on Digital Equipment was being printed, I got two calls from Digital original equipment manufacturers of a surprisingly contrary nature. It may be sour grapes since Digital has been tightening discount screws on resellers lately, but these sources were looking for ways to migrate to other platforms. Both sell AT-based products, as well as Microvaxes.

- International Data Corp.'s mini-computer expert, Aaron Goldberg, has predicted a 10-year lifespan for the 80386-based operating system, which we now know as the OS/2 Extended Version.

Maybe it's the rainy spell we're having here in New England, but I'm beginning to wonder if IBM hasn't done it to us again. Dale Kutnick, long-time friend and now an IBM guru at the Gartner Group, once described to me what he called IBM's Trojan horse strategy. Take over desktops — with open architecture if necessary — just to gain the real estate. Then build down from the mainframe side (9370?) and up from the PC side (OS/2 Extended Version?). Sooner or later go proprietary, and scrunch the bejesus out of everybody in between.

This, mind you, was a theory articulated over five years ago.

The vision here is of corporate infor-

mation systems groups buying in to the new IBM technology for its new capabilities and letting the old architectures rot, dusting off emulation software routines whenever necessary. Don't kid yourself, IBM has abandoned plenty of architectures and products before. If it's worth doing, IBM will do it.

I haven't fully subscribed to the IBM *weber alles* premonition, but I might at least be on record as having thunk the thought.

What happens if IBM has pulled a major coup? Well, the application software business stays robust, but the operating system business (most of Microsoft) goes south, along with all but the hardest of clones. So Compaq lives in the manor of an Amdahl, but Leading Edge and Epson go the way of Intel. Digital goes back to the scientific community, and the peripherals and add-in board makers do about as well as today's CRT vendors. Apple joins Unisys, and Tandy turns into a computer repair center and parts distributor.

What a thought, huh? I wonder if it's run around anyone's brain at Blue Blue?

John Gantz is editor of the Tech Street Journal, a newsletter on the high-tech stock market and business performance. The views expressed are his own.

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Tech Talk

By Steve Gibson

Popping Up With a Hot Key Involves More Than Just a Lot of Pointing

Last week we saw that resident software is able to remain resident simply by asking DOS to move the loading point of successive programs up past its own end. However, in doing so, its own execution is terminated. This week, we'll see how such software is able to regain control of the computer for the performance of its assigned duties.

A computer's actions are directed by its reading of instructions that are stored in its main memory. These instructions may be temporary, as in the case of programs loaded from disk into random-access memory (RAM), or permanent, as in the case of instructions permanently wired into ROM chips. In either case, each instruction has an address, which is the number of the byte it occupies in the machine's memory.

We make the computer perform a given task by having it read a series of instructions that detail the task. In a sense, we call upon those instructions whenever we need their intended function. The end of such a called sequence generally has a clever instruction, called Return, which is able to send the computer back to wherever we called it from!

This notion of *functions* performed by instruction sequences called upon in memory, and which will return to us

when finished, is very powerful. IBM-compatible computers come equipped with a BIOS ROM that contains a host of very useful general-purpose functions that return control to their caller as soon as they have performed their designated duty. This is exactly what the BIOS ROM is all about.

We must know the exact address of a function in order to call it into service. By convention, the starting address of every built-in function in the IBM PC is located in a table of addresses at the start of the computer's RAM memory, and every function is numbered by the location of its address in this table. This means that in order to call for any built-in IBM PC function we need only know its standard function number.

There's even a clever computer instruction that lets you directly call upon a function whose address is stored at a specific location in this table. So, in effect, you can simply ask the computer to call standard function no. 7, whereupon the computer will look into the seventh slot in the table for the address of function 7 and go there directly, returning to you when the function has been completed. The official term for a place that contains the address of something else is a *printer* or a *vector*.

Even the electrical hardware of the

computer is able to call upon these standard functions. In fact, many of the standard functions in the ROM BIOS are designed to operate hand-in-hand with the PC's hardware.

For example, every time that a keyboard key is either pressed or released, the standard function no. 9, whose address is in location 9 of the Address Table, is called upon by the hardware. This function is called even if the software is busy doing something else at the time.

The hardware's capability to interrupt whatever the software might be doing is called a "hardware interrupt." Essentially, the keyboard hardware says to the processor:

"Hey there, remember where you are and what you are doing. Now go perform the function whose address is in slot no. 9, and when it returns to you, go back to what you were doing just like nothing ever happened."

This is *exactly* how we are able to type ahead of our computers. Even if our spreadsheet is lost in thought recalculating our tax refund, we're able to type ahead of it because each depression and release of a key steals a fraction of a moment of time away from the recalc. The function invoked by the keyboard's hardware interrupt places the key into a

type-ahead buffer — which the spreadsheet will read from as soon as it is good and ready.

Now, imagine what would happen if some program were to point the pointer stored in the ninth table location to somewhere else, such as to itself, prior to issuing a terminate-and-stay-resident (TSR) request to DOS.

Then the hardware interrupt occurring at every keyboard action would turn control over to this TSR'd program instead of to the normal built-in keyboard-handling function. If the resident program wasn't "interested" in that particular keyboard action, it could then pass control along to the place where the pointer had pointed, just as if it hadn't been eavesdropping at all. However, if the key action happened to be *this* resident program's assigned Hot Key, it could retain control of the system as long as it wished before passing it along as if nothing had happened!

Next week, with these TSR fundamentals established, we'll look at the causes of, and cures for, the troubles in TSR paradise.

Steve Gibson is the developer and publisher of *Flicker Free* and president of Gibson Research Corp., in Irvine, California. The views expressed are his own.

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Resources

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May 5-7, New York: The National On-Line Meeting will gather experts on on-line databases and electronic information services. Call: (609) 654-6266. Location: Sheraton Centre Hotel. Admission: \$290.

May 14-15, Boston: "Desktop Publishing: A Practical Tutorial" features case histories of companies successfully using desktop publishing, as well as product comparisons. Call: (617) 470-3880. Location: Sheraton Rolling Green. Admission: \$795.

May 18-20, Cambridge, MA: "The Technology Forum," sponsored by Patricia Seybold's Office Computing Group, will present information on new business computing trends and products. Call: (617) 742-5200. Location: Royal Sonesta Hotel. Admission: \$1,095.

June 1-4, Atlanta: "Comdex/Spring '87" features sessions on desktop publishing, Macintosh software and connectivity, and hardware trends and technologies. Call: (617) 449-6600. Location: Georgia World Congress Center. Registration fee: \$195.

June 10-12, Ann Arbor, MI: "The Hack '87" is a conference and forum that will gather together more than 200 Macintosh software developers. There will also be product displays from Macintosh software and hardware vendors. Call: (313) 882-1824. Location: Ann Arbor Holiday Inn West. Registration fee: \$225.

Correction: The Seybold Group's Desktop Productivity Conference, scheduled for May 7-9 in New York, has been postponed until fall 1987.

— Carol Czychowski

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• SUPPORT

3rd-Party Support Firm Draws Users' Applause Company Offers 'Warmware'

By Priscilla M. Chebol

A unique service firm that provides corporate PC managers with soup-to-nuts consulting, maintenance, and support services is garnering applause from its customers.

"What we provide is 'warmware,'" said Jim Price, president and CEO of Pritronix, a Dallas-based company that offers third-party support services for corporate MIS and PC professionals. "We give clients whatever they need in terms of support and hand-holding."

Warmware can include anything ranging from general maintenance to logistics support, product evaluations, or systems integration, said Price, who added that his company's specialty is integration.

"We help clients make various configurations of hardware, software, and operating systems all work together," Price said.

By supporting products from 138 manufacturers — in many cases acting as authorized dealers in order to qualify for discounts — Pritronix offers objective product recommendations, Price said. "We're not buying just to spend money," he said. "Our goal is the same as the customers': since we have to support and maintain the products we recommend."

In many cases, corporations like Dallas-based Members Mutual Insurance Co. originally contract with Pritronix for PC maintenance and then use the firm for other services as well.



Jim Price is president and chief executive officer of Pritronix, a third-party consulting, maintenance, and support service company for corporate MIS and PC professionals.

"They bought us PCs, hard disks, and modems at prices a lot better than what we could find," said John Honegger, assistant vice president for data processing at Members Mutual, who said that he next turned to Pritronix for network consulting.

Pritronix also provided Houston-based Conoco's product supply and trading department with network services. "Pritronix spent a lot of time with us explaining what a network was, how it worked, and what the costs involved were," agreed Orville Wiens, network supervisor for Conoco. "They did a lot of hand-holding before they brought it in and got it running."

The high-growth rate at Den-

ver-based U.S. West convinced Steve Hall, manager of procurement and contracting, to turn to Pritronix.

"We'll have 500 users by June 1 in a 14-state territory," Hall said. "Pritronix's remote diagnostic response time can fix a problem at a Billings, Montana, site better than we could in-house."

Conoco's Wiens said Pritronix helps him keep him in touch with new products. "We were set to buy a laser printer, but they talked us into waiting," Wiens said. "About a year later, they told us they had found and tested one they could now recommend; they're interested in getting us what we need without stacking on a lot of extra hardware and software."

• ELECTRONIC DISTRIBUTION

Product Allows Corporations To Download PC Programs

By Edward Warner

Although electronic software distribution is often hailed as the wave of the future, many PC professionals say it's not all it's cracked up to be. Still, a product introduced last month and currently being beta tested is attempting to change this perception.

Both Chevron Information Technology Co., in San Ramon, California, and Metropolitan Life Insurance Co. of New York will become beta sites this year for the \$75,000 Sofstore electronic software distribution package that DTSS of Hanover, New Hampshire, introduced last month.

DTSS, a Metropolitan Life subsidiary, claims that Sofstore (which runs on IBM VM/CMS using SQL/DS) is the first program that allows large firms to download PC software.

Among Sofstore's features, said DTSS president J. Peter Manzo, are two on-line databases: one containing the code for all PC programs that can be downloaded by users and another that profiles each PC user in the corporation — both the hardware configuration and the software packages being used.

Comparing the two databases can help managers avoid downloading a program to a user whose PC has insufficient memory, said Manzo.

Chevron hopes to electronically notify personal computer users when upgrades arrive — presently, letters are sent, ac-

cording to Randy Wiseman, who is the coordinator for product support.

Karl Kendall, information center manager at Metropolitan Life, said his company hopes to reduce to one day the seven to 10 days it now takes for software orders to reach Metropolitan Life headquarters from PC users at remote sites.

However, both Kendall and Wiseman said that electronic software distribution has its limitations.

PC terminals must have mainframe terminal emulation capability and printers that can print the downloaded documentation that goes with the software.

Wiseman, who once had to distribute to users a three-ton stack of Lotus 1-2-3 upgrades, said Sofstore would not have helped that situation, since the documentation, if downloaded, would have tied up all the organization's printers.

And because Chevron Technology has a limited number of mainframe-compatible printers, it can only electronically distribute one-diskette software updates and other small programs.

Another restriction on the size of downloadable programs is the cost of mainframe time, which Jeffrey Tarter, the publisher of Softletter, in Cambridge, Massachusetts, said can be prohibitive. Because of the expense of mainframe time, it can cost as much to download Lotus 1-2-3 as to buy it from scratch, said Tarter.

• INFORMATION SYSTEMS

Bank Uses PCs For Executive Communication

By Jeff Angus

Jim Watt's job as director of software services for California's Security Pacific Bank was to figure out a way to enhance communication between decision-making executives while the company was cutting back on secretarial support.

"When we realized we could get the biggest gains from making our PCs productive at the executive level, we built a two-part executive information system based on furthering productivity and the need to exchange information on a summary level," said Watt.

As part of this strategy, Watt developed a "war room" where executives could coordinate high-level information on loans, finances, and outstanding commitments using a system that integrated word processing, telephone management, and electronic mail.

The trickiest part of that, according to Watt, was overcoming executives' dislike of keyboard work. Because of that

dislike, Watt chose a pair of easy-to-learn, off-the-shelf packages and then prepared them for the specific uses of the Security Pacific executives.

For phone management, Watt chose Prodex, by Prodex Development Corp. of Seattle.

"We preloaded the necessary directory information on key contacts and then allowed executives to add their own contacts," said Watt. "It's quick to find a directory entry, and with one key, they can use Prodex's auto-dialing feature."

The electronic mail feature in Watt's system was a productivity boon to the executives, he said.

Before the system was installed, spur-of-the-moment ideas and insights that executives wished to communicate to others were often lost because of telephone tag. Now, Watt said, if executives can't reach someone by phone, they can write a quick note via electronic mail.

Watt chose CC-Mail electronic mail from PC/Systems of Palo Alto, California, for the same reason he chose Prodex: It was easy to learn. He is convinced the executives can communicate far more effectively this way and says there have already been cost savings because the new system eliminates the need for a lot of clerical support.



A Capital View

By Jerry Schneider

Gene Barlow's Departure Reflects IBM's Indifference to User Support Issues

Gene Barlow is leaving. Although his name does not elicit widespread recognition in the computer industry, Gene is probably one of the best friends and strongest supporters for user groups within IBM. For the past five years, Gene has been the manager of the User Group Support Office at IBM Corp., in Boca Raton, Florida.

When Philip (Don) Estridge and Bill Lowe were first building the IBM PC empire in Boca Raton, one of their first concerns was the establishment of a vibrant user group community. They reasoned — and rightly so — that the best product advertising was a large base of satisfied customers. They believed that by working with a network of independent user organizations, IBM would have access to invaluable resources for product testing, evaluation, and market research. And, since user groups play a vital role in providing direct technical support and assistance to individual users, IBM would be able to improve its own support services at minimal cost through mutual cooperation.

Early in 1982, with the full support of the then-chairman John Opel, Gene Barlow was appointed to begin staffing this ambitious undertaking. Over the next few months, he brought together an energetic, hard-working group that start-

ed initiating contacts in the user community to ascertain their requirements.

In discussions with numerous user groups around the country, the IBM User Group Support staff encountered much enthusiasm, cooperation, and support for their efforts.

During the next few years, the User Group Support Office put together one of the best user group support programs offered by any manufacturer. At its peak, Gene's crew of dedicated workers numbered almost two dozen people.

While IBM never did permit access to technical support information, the support services included a monthly newsletter, *The Exchange*; dissemination of new product information and updates, including complete announcement materials on disk for computerized bulletin board system usage; a speakers bureau; new product presentations at user group meetings; a locator system to provide people with the names of user groups in their locales; information and assistance on how to start a user group; and an electronic bulletin board system for distribution of information and articles to and among user group leaders and members.

Despite the fact that this was the only program offered by IBM to the individual users of its products, it soon became

the target of intense corporate budget cutting.

Apparently, corporate IBM took a very narrow view of the activities of the User Group Support Office. Instead of evaluating the good will, customer satisfaction, and other appreciable benefits that accrue to IBM from such an operation, the powers that be looked only at its inability to generate income; in other words, it was just another expense item in a vast corporate spreadsheet.

As a result, Gene's staff was reduced to only a handful, the publication became bimonthly, bulletin board support was drastically reduced, travel became almost nonexistent, and other support services were similarly curtailed. While most other manufacturers were discovering the importance of user groups and were expanding their user support programs, IBM was cutting its support into oblivion.

And so, it is no surprise that Gene has decided to transfer away from the User Group Support Office. As a long-term IBM'er, Gene knows that there is no career growth in an office that cannot get proper budgetary support. For those of us in the user community who have worked with Gene, we will miss him dearly.

If IBM intends to be competitive in the microcomputer market, it must

understand that the users do not select and purchase their products blindly. While we are concerned about product quality, we are equally concerned about product and user support. IBM has good reasons to be proud of the technical excellence and quality of its microcomputers. By the same token, however, IBM should be embarrassed by the inadequacy of its basic user support programs and its continued efforts to dismantle the few programs that it does provide.

IBM must not continue to view user support as an expense item; it must realize that customer support represents one of the best investments it could make in its future. To assure continued growth and prosperity, good customer support is far more important and effective than expensive advertising campaigns.

I believe that the time has come for corporate IBM to rethink its policies regarding user support programs. Instead of finding ways to reduce services, IBM should direct its energies and resources at strengthening, improving, and expanding its existing support services. If you don't understand what I am talking about, ask any user; better still, ask Gene Barlow!

Jerry Schneider is an industry analyst and president of the Capital PC User Group. The views expressed are his own.



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from Peter Norton's recent column - PC Magazine, issue #13, 6/88

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A User's View

By Jerry Pournelle

Companies That Encourage Employee Flexibility Stand to Profit in the Future

I don't often become incensed by what I read in *InfoWorld*, but the article "Many Users Become too Technical, Analyst Says" in the April 20 issue managed it nicely. I see that the high priests are striking back.

The article is called an analysis, and it reports that, "All too many corporate PC and information center managers are 'growing' PC users who are far too technical for their own good, according to MIS consultant Charlotte Hofmann, president of the Oakland, California-based Information Ideas Inc."

It added up to a true advocate of the MIS high priesthood being horrified because mere users were challenging the MIS supremacy.

The article went on to say that many PC users neglect their jobs in order to pursue PC expertise and that this costs their companies mountains of money in two ways: First, these ambitious wretches may neglect their normal work and let the job slide, and second, in their arrogant pride they'll "demand increasingly large amounts of support from the information center staff."

"These advanced technical users take more support time from more expensive information center personnel," said Hofmann.

There was a lot more of that kind of talk; it all added up to a true advocate of the MIS high priesthood being horrified because mere users were challenging the MIS supremacy. What Hofmann was really saying was that users ought to go back to being docile, the way keypunch operators used to be, and let the central EDP people continue to guide their companies.

This is balderdash. In the first place, while I grant you there are exceptions, most people with the intellectual gumption to want to learn more about the tools of their job should be encouraged, not put down by some consultant spouting the EDP manager party line.

According to Hofmann, instead of these horrible "technical users," companies ought to prefer the "typical user": someone who "hunts through the Lotus 1-2-3 manual just to figure out one little function . . . and if you ask them to do anything with Lotus other than what is strictly related to their job, they can't."

This person is, according to

Hofmann, far to be preferred to the "technical user," who, indeed, ought to be anathematized. Hofmann didn't say these incipient hackers ought to be required to carry a little bell and go through the streets shouting "Unclean! Unclean!" but she sure implied it. Technical users "are the ones information center managers should avoid. These users are interested in technology for its own sake, and eagerly pursue PC knowledge even when it doesn't have anything to do with their actual day-to-day jobs."

How terrible of them to want to better themselves! How awful that they want to learn as much about their tools as they can! For, of course, they're doomed. The MIS and EDP specialists know what's relevant to these people's day-to-day jobs; the silly people actually *doing* those jobs couldn't possibly find a way to improve the methods set up by the almighty priesthood. Away with them!

"Technical users are the ones you find reading the manual to find out all the little quirks of a particular software package and who sign up for advanced Lotus 1-2-3 classes." And then those people "stop focusing on their jobs and how PCs can help their business needs, and instead become interested in the mechanics/features of software and hardware products."

Horror! Next thing you know, they'll be suggesting different programs! Faster PCs! Better workstations! More decentralization! They will be challenging the decisions of the MIS and EDP priesthood.

But, fortunately, there's hope. The highest level of PC users within a corporation are what Hofmann called "advanced technical" users, who had actually transcended the technology to arrive at a conceptual understanding of how information processing can be used as a strategic weapon for the corporation.

"In this class are the chief information officers of large corporations."

Well, yes. They're also the people who hire firms like Information Ideas Inc. as consultants, so perhaps we shouldn't be

surprised that Hofmann treats them with great deference.

One wonders: Where do these wonderful people come from? Clearly not from within the corporation since we are warned to get rid of anyone with that kind of ambition. I suppose they are to spring full-grown from the brow of Zeus — or in this case, with a Stanford B.S. in computer science and a Pepperdine M.B.A. — before they apply for a job.

"PC managers must keep in mind that the PCs are owned by the corporation, where the bottom line is making money," Hofmann tells us. And therefore, "The challenge is to discourage users who want to move from being 'typical' to being 'technical.' The best way to do this is maintain a tight focus on helping PC users do their jobs better, rather than enhancing skills not necessarily relevant to the business of the organization."

Now I'm not an MIS consultant, and if Charlotte Hofmann is a good example, then I never will be one.

What I think has been said here is: "We at the top of the corporation know what this company should be doing, and how it should be done. We have hired computer experts, and they know all that is necessary about the application of computers to the job."

"Therefore, employees should know what they are told, when and how they are told to do it; should never question the decisions of management; and certainly should not seek to develop skills outside the areas to which we have assigned them. If we need people with new and different skills, we'll go get them. From somewhere else. Somewhere our consultants recommend."

That sounds to me like a formula for disaster.

It also misses the point of the computer revolution.

Do understand, I'm not one of those people who think the secret goal of business ought to be charity. I'm as addicted to profits as any stockholder. There may be legitimate business purposes in giving money away — having an image as a good guy is worth something, and often a gift in the right place will generate more publicity than you could have bought for the same money — but the real business of business is business, and that means making profits.

It's also true that people work harder if they're doing things they want to do. Pournelle's Rule states that if they have to pay you money to get you to do it, it's called "work"; but there's work and work, and not all of it need be unpleasant. The most successful companies I know

have employees who spend more of their time doing things they want to do. You can't always arrange things that way, but surely it's worth trying for. More importantly, you should not deliberately make it a goal that your people are not doing what they would like to do.

Even more importantly, the Hofmann view misses the point of small computers. Now I suppose there must be a few companies out there that have entrenched places in secure niches — who can go on doing the same old stuff in the same old way for years and decades to come and still make profits — but I'd be hard pressed to name any.

Most companies face a different problem.

In this fluctuating world of high technology, it's much more likely that your company will change its focus and emphasis a dozen times in the next 20 years. Suppose you're the widget king. You've fought hard for 20 years, and now you have 85 percent share. Well, it's unfair as all get out, but someone could invent a ghettoeek that does everything people expect of a widget, and costs less; so that

who understood the market better than anyone else, and whose management style was "Do it my way." The problem is, when conditions change rapidly, the boss may no longer understand the market; and since all the employees have either been intimidated or put in a condition in which they *want* to see the top dog take a pratfall, the company isn't going to adapt in time.

Many years ago, when I worked in the aerospace industry, I met a senior colleague named Cob Beum who taught me his corporate philosophy: The Boeing Co. insisted to keep us happy. This implied a reciprocal obligation, of course: We had to do things that would make the company *want* to keep us happy. So long as we did, there was a balance.

Cob also had the theory that you could get anything you wanted from a firm like Boeing; you only needed to find what form to fill out. I never saw any reason to believe he was wrong.

When I was at Boeing I was encouraged to take graduate classes at the University of Washington. Not only was I given time off to do that, but

In Japan, factory workers are encouraged to understand company goals, and are invited to discuss ways to improve performance. The practice does not seem to have destroyed Japan's ability to compete.

you either change to ghettoeeks, and do it *fast*, or you go under. Or, worse: Widgets could get real popular. Become a fad. Suddenly everyone is interested in getting in on the widget boom. A mad start-up spring forth. There are new and different economies of scale. Your old production methods are no longer as efficient as the competition. Now what do you do?

If you've designed your organization for flexibility, you can not only weather the storm, but make profits from it. After all, you'll have distribution channels and a good feel for the market. All you need is motivated employees who understand their work — and are flexible enough to try new methods.

On the other hand, if you've built a dictatorship, then you'd better have one smart dictator. Sometimes, of course, dictators are smart. Plenty of companies have been built by one person

boeking paid for my tuition and books. The policy doesn't seem to have harmed Boeing much.

In Japan, factory workers are encouraged to understand the goals of the company, and are invited to discuss ways to improve performance. The practice does not seem to have destroyed Japan's ability to compete.

Any company lucky enough to have employees who are interested in what they are doing, interested enough to sign up for advanced courses, is going to have a strong competitive edge; and far from discouraging such people, that firm ought to be out looking for more of them. But then I'm not president of an MIS consulting company, so what do I know?

Jerry Pournelle is a noted science fiction writer and computer columnist. The views expressed are his own.

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WordPerfect
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People are never satisfied. They get an AT-level desktop computer with a speedy 20-megabyte hard disk drive, and they begin to yearn for hard drives with even greater speed and more capacity.

Currently, 40-megabyte drives are the most popular size for the IBM AT and compatibles. For this product comparison, *InfoWorld* examined seven 40-millisecond or faster drives for the AT.

In each case, we installed the drive as the primary drive in our 6-MHz PC AT Model 99. All but the Core connected to the AT's hard disk controller. (The Core drive came with its own controller.)

We followed the manufacturers' setup instructions when they were provided; otherwise we made our best guess.

The most surprising thing we discovered was that all but the Core AT40F offered comparable performance when set up with one 32-megabyte partition and an interleave factor of 2. The AT40F is the exception because it uses a different interface technique, improving performance.

Partitioning software makes it possible to use the full 40-megabyte capacity of the drive. Both Core and Priam sent us software to take advantage of the whole drive, although we didn't use it. Instead, we chose to measure the drive's performance with the largest possible DOS partition (32 megabytes) using standard software.

We also looked at how easy it is to remove and reinstall the terminator resistor packs in each drive. You would have to remove the resistors to install the unit as a second drive in your system; you would reinstall the resistors to make the drive the main unit in a different system. Unless specifically noted, removing and reinstalling resistors was not unduly difficult or easy.

All the manufacturers claim their drives are self-parking, so you won't ►

FAST HARD DISK DRIVES FOR THE AT

BY STEVEN SATCHELL



have to run separate software before moving your system.

CDC Wren II, Half-Height

The \$1,335 half-height version of the Control Data Corp. Wren II is one member of a large family of Wren drives. We received only the original equipment manufacturer manual from Control Data. Several distributors sell packages with instructions, cables, and mounting hardware for the drive.

This was the only drive that does not closely match the AT's built-in disk drive setups. To improve the match, Control Data provides a software driver that adjusts the controller's configuration. Using the drive without the software driver resulted in all kinds of data errors

when we tested it on an Epson Equity III+. We got no errors, however, when we ran it on the IBM PC AT. (Control Data claims that another version of this drive does not require the special driver.) The CDC drive also has a pretty hefty power requirement of 4.5 amps at startup and 2 amps when running, so putting two drives in your AT will strain the power supply.

In addition, the terminating resistor pack is almost impossible to remove, and putting the terminator back is impossible.

Pros: Good vendor reputation. Cons: Requires special software driver, tricky setup, high power requirement at startup, FCC Class A certification.

Control Data Corp., 8100 34th Ave. S., Minneapolis, MN 55440; (612) 851-4131 or (800) 828-8001.

Microscience HH-1050

Another original equipment manufacturer drive came from Microscience. With the right set of instructions, cable, and mounting rail, this drive proves to be a good performer. Check if your dealer provides these items. The OEM guide we received from Microscience was enough to get us going.

Setup and reconfiguration is simple with this \$850 half-height drive. Everything is done with switches instead of jumpers and chips. As with all drives larger than 32 megabytes, you will need partitioning software to make full use of the capacity.

The Microscience HH-1050 also has the second-lowest power requirement in this group of drives: 2.3 amps at startup,

0.90 amps when running. This means that two drives will not tax the power supply of your AT.

Unfortunately, this drive is the noisiest of all the drives in this evaluation, according to our sound-level meter. Mount your system unit next to your desk (as we did), and you'll find the noise less objectionable.

Pros: Low power consumption, easy setup with switches. Cons: Noisier than most.

Microscience HH-1050, Microscience Corp., 575 E. Middlefield Road, Mountain View, CA 94043; (415) 961-2212.

Seagate ST251

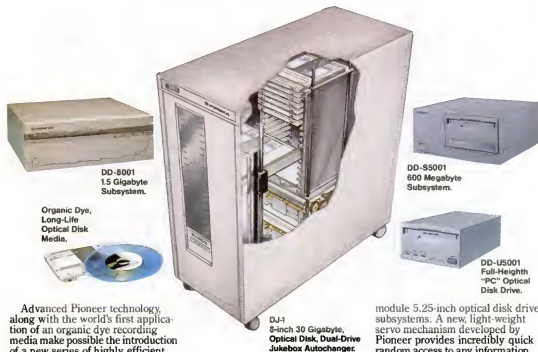
The Seagate Technology ST251 half-height drive (available at \$635 in quantities of 500) is second only to the Microscience drive and offers the lowest power consumption when running (0.5 amps) and at startup (2.0 amps). This means that two drives can fit in either an XT-286 or AT-class system with ease. As with the above three drives, our evaluation unit came with just the OEM manuals.

Although the drive is billed as having integral vibration isolation (shock mounting), we found that one of the four mounting brackets is fastened directly to the drive housing. This defeats the rubber isolation provided on the other three mounts, in our opinion. Thus, the drive is more sensitive to shock when being transported.

Pros: Low power requirement, readily available. Cons: Incomplete shock mounting.

Seagate Technology, 920 Disc Drive, Scotts Valley, CA 95066; (800) 468-DISK in CA, (800) 468-DISK outside CA.

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Subsystem.

DD-S5001
600 Megabyte
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DD-U5001
Full-Height
'PC' Optical
Disk Drive.

DJ-1
8-inch 30 GigaByte,
Optical Disk, Dual-Drive
Jukebox Autchanger.

Advanced Pioneer technology, along with the world's first application of an organic dye recording media make possible the introduction of a new series of highly efficient, low cost, write once (W.O.R.M.) optical disk subsystems from the leader in optical technology... Pioneer.

Featured in this new product line is Pioneer's DJ-1 eight-inch Optical Disk Dual Drive Autchanger Jukebox. This high-speed optical disk jukebox provides for up to 30 gigabytes of data storage capacity (20 two-sided removable cartridges) with an End-User price of \$40,000 per unit... that's less than a \$1.35 per megabyte of storage capacity.

The 8-inch drive which is incorporated in the autchanger, is also available in a stand-alone configuration. The DD-8001 eight-inch

stand-alone subsystem combined with the DD-801/DC-802 optical disk media represents the ideal, compact disk drive. (1.5 gigabytes on two sides). The DD-8001 is equipped with the SCSI high-speed parallel computer interface and is available with MS-DOS operating software. With an End-User price of \$15,000 per unit, this front-loading, high-speed drive is ideal for any type of desk top system configuration.

In addition to this outstanding 8-inch technology, Pioneer is also pleased to introduce the DD-U5001 stand-alone and DD-S5001 "PC"

module 5.25-inch optical disk drive subsystems. A new, light-weight servo mechanism developed by Pioneer provides incredibly quick random access to any information on the disk. At an End-User price of between \$2,800 (DD-U5001) to \$3,500 (DD-S5001), the 5.25-inch subsystems are provided with the SCSI interface and full MS-DOS operating software will be available. Each double-sided DD-502 optical disk offers 600 megabytes of storage capacity (300 megabytes per side). Pioneer's unique 8-inch and 5.25-inch low cost organic dye optical disk media ensure a data storage life of greater than 15 years.

Pioneer is recognized as a world leader in the research, development and manufacturing of optical products and systems.

Glossary of Terms

Seek time: The time it takes the head to move to a new sector on the disk.

Track-to-track seek time: The time required to move the head to the next track.

Full seek time: The time required to move the head between the two sectors that are farthest apart; it represents the longest seek time.

Average seek time: The average time required to perform a typical seek, calculated by performing every possible seek and averaging.

Latency: The time it takes for the disk to spin a particular sector under the head for reading. On average, this is the time it takes the disk platter to spin half a revolution.

Average access time: How long it takes on average to move from one sector to another sector and then read that sector. This can be calculated by adding the average seek time to the average latency time.

Self-parking: Automatically retracting the read/write heads to a safe idolo-hold landing zone on the drive and locking them there when the power is turned off. Ensures that the drive won't be damaged when moved.

Shock mounting: Vibration isolation (usually, rubber grommets) reduces the chance of damaging a hard disk drive while in operation or during transport. Dropping a running system from a height of three inches can be enough to damage an unprotected drive.

Drive identification: Letter, number, or name by which the computer identifies and distinguishes among connected drives.

PIONEER LaserMemory™

For more information, contact Pioneer Communications of America, Inc., Optical Memory Products Division, 1058 East 230th Street, Carson, California 90745, (213) 513-1016.

Please join us at Comdex-Spring, Booth 3026 and at NCC, Booth 5408/5410.

Before You Buy Your Hard Disk

The whole purpose of buying a hard disk drive is to accommodate more files and data without changing media. Getting too small a drive defeats this goal. Too large a drive is usually a waste of money, but many times the extra capacity comes in handy when your work load unexpectedly triples. So the trick is to get the size drive that fits your needs now and will handle your increased capacity next year.

This brings up another issue. People using MS-DOS 3.2 and below will find that DOS puts up a 32-megabyte barrier on the amount of data that can be accessed on a single drive. Accessing more than that amount requires special software that partitions the drive in two or more portions, which are then addressed by software as if they were separate drives (for example, C: and D:). Most vendors, and many dealers and distributors, provide that software. If you partition the drive, however, several useful disk maintenance utilities will no longer function properly.

Further, how the vendor partitions the drive — two equal-size portions vs. one large and one small — can have a great impact on the drive's performance. Balancing the size of partitions usually provides the best performance.

In addition, prices rise with drive speed, so you'll want to determine how badly you need a fast drive. If the bulk of your programs run in memory (spreadsheets, word processors), or access the disk only occasionally and at a slow rate (telecommunications), then just about any speed will do.

But if the majority of your programs constantly grab information from the disk (databases, desktop publishing), then your performance will relate directly to the speed of your drive.

There is a point of diminishing returns, though. The fastest hard disk in our study (18-millisecond average access time) was only a so-so performer as seen by the application, because MS-DOS processes operations in a serial, rather than parallel, fashion.

In addition, we recommend you only consider a drive that automatically parks itself (locks the heads in a "landing area") when the power goes off. It prevents the disk from crashing in a power failure.

PC AT owners have an additional concern: overloading their power supply. According to IBM's *Technical Reference* for the AT, disk drives are allowed at most 7 amperes from the 12-volt power supply. This means that your system is re-designing if two hard drives (or a hard drive and tape backup system) together require 7 amps. Some of the hard disks we tested require as much as 4.5 amps each when you first turn on the system. External drives such as those for the Mac don't have this problem since they connect separately to an external power supply.

Tandon TM755

Another readily available disk drive is the Tandon TM755, which users can buy for \$850 without the controller or \$995 with it. This half-height drive requires a little more power than either the Microscience or the Seagate drives (2.5 amps at startup, 1.4 amps when running), but you can still comfortably put two in an AT-style machine. Tandon sells this drive for installation in XT systems as well. Our drive came with an XT hard disk controller and instructions, as well as mounting rails for the AT (but not its instructions).

The Tandon drive provides the best balance of features of the four half-height drives we tested. The drive-select jumper is well-marked, the termination resistor

is easy to get to if you are installing a second drive, and the drive itself installs easily.

Pros: Low power requirement, better jumper and terminator access. Cons: No significant failings.

Tandon Corp., 405 Science Drive, Moorpark, CA 93021; (805) 523-0340.

Priam ID-40

Priam has a reputation for producing a good hard disk package designed for the end-user. The full-height \$1,398 ID-40 continues this tradition. Priam packages everything you need to install and use the full capabilities of this drive, including partitioning software. Priam's installation instructions are excellent. Our only concern is the high power requirement

— 2.8 amps when running and 4.5 amps at startup — which prevents you from installing a second drive, should you want one.

This is also the third noisiest drive in our evaluation.

Pros: Good installation instructions. Cons: Higher noise than most, high power consumption.

Priam, 20 W. Montague Expressway, San Jose, CA 95134; (408) 434-9300.

Miniscribe 6053

When the IBM PC AT first came out with its less-than-reliable hard disk, dealers often used the Miniscribe line of drives to replace the CMI-20 drive supplied by IBM. The 6053 has turned out to be quite a workhorse.

RUN LOTUS, RUN.

Prints Printed
No. Pages
Lines 12-12
Black Graphics/
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OKIDATA MICROLINE 292/293

100 REBATE
When the Microline 292 or 293 is used with the IBM compatible Microline 292/293 printer for details.

If Your Business Runs On Lotus 1-2-3, OKIDATA Can Run It 6 Times Faster.

The time to buy an IBM®-compatible MICROLINE® 292 or 293 personal printer is now. Because if you do, we'll give you — FREE — a special driver program that puts your Lotus work on paper up to 6 times faster than IBM or Epson®. So when you're using Lotus 1-2-3, Symphony®

	OKIDATA	IBM	EPSON	EPSON
	ML 292/293	PROPRINTER	PX-500	EX-800
LOTUS SYMPHONY (PGS. TEXT/2 HRS.)				
NEAR-LETTER QUALITY TEXT	273	109	91	135
LOTUS 1-2-3 BLACK GRAPHICS (GRAPHICS/2 HRS.)				
LINE RESOLUTION	139	61	60	68
HIGH RESOLUTION	73	12	12	12

The OKIDATA model 292 and 293 printers have successfully passed compatibility testing with Symphony Release 1.1 and Release 1.2, Lotus 1.2 Release 2.0 and Release 2.0.1, and 1-2-3 Report Writer using an IBM Personal Computer with PC-DOS 5.1. Drivers for the appropriate OKIDATA printer must be installed.

*The Lotus-compatible printer driver works with all IBM-compatible MICROLINE 292 or 293 dot matrix printers. It enhances the performance of the printer when running Lotus 1-2-3 (Release 2.0 and 2.0.1), Symphony (Release 1.1 and 1.2), and 1-2-3 Report Writer (Release 1.1). Lotus and IBM are trademarks of Lotus Development Corporation. IBM is a trademark of International Business Machines Corporation. Epson is a trademark of Seiko Epson Corporation.

and 1-2-3 Report Writer™ you'll get a lot more done in a lot less time.

You'll print all your correspondence quicker. See your spreadsheets sooner. And get crisp, clean black graphics in as little as ¼ the time it takes on comparable printers.

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EVALUATED HARD DISK DRIVES FOR THE IBM PC AT AND COMPATIBLES

Product	CDC Wren II	Core AT40F	Microscience MH-1050	Miniscribe 6053	Priam ID-40	Seagate ST251	Tandon TM755
Price	\$1,335	\$2,995 ¹	\$850	\$819	\$1,398	\$635 ²	\$850 ¹
Self-parking	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shock mounts	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Height	half-height	full-height	half-height	full-height	full-height	half-height	half-height
Power (watts)	20	33	15	27.50	35	13	20
Running power (amps)	2.0	1.4	0.9	1.8	2.8	0.5	1.4
Starting (amps)	4.5	4.5	2.3	3.5	4.5	2.0	2.5
Benchmark sequential*	1,339	2,444	1,348	1,068	1,351	1,044	1,347
Benchmark random*	1,225	1,286	1,211	1,191	1,217	1,113	1,163
Manufacturer's Specifications (in milliseconds)							
Seek: track-to-track	5.00	4.00	5.00	6.00	5.00	6.00	5.00
Seek: average	28.00	10.00	28.00	28.00	28.00	40.00	35.00
Seek: full	65.00	16.00	60.00	55.00	60.00	95.00	65.00
Latency	8.33	8.33	8.33	8.33	8.33	8.33	8.33
*Relative to the CMI 20 running in the IBM PC AT Model 99 - 1.0 (InfoWorld Hardware Benchmark System)							
¹ Price without controller ² If purchased in quantity of 500 or more							

This \$819 full-height drive requires less power than the CDC and Priam drives (3.5 amps at startup), so you can put two in your AT, fitting just at the red-line figure of 7 amps.

Early AT-class systems cannot be set up to interface to this drive reliably because of changes in controller setup requirements. Newer machines, however, have a type specification that is a better match for the 6053. But in no case did we run into problems with the drive.

Pros: Mature product. **Cons:** High but not excessive power requirement, interface problems with 2-year-old ATs and compatibles.

Miniscribe Corp., 1861 Lefthand Circle, Longmont, CO 80501; (800) 824-3799.

Core AT40F

This drive has us puzzled. We measured, with Coretest, a seek time of 9 milliseconds (which results in an average access time of 18 milliseconds), yet the random access performance as measured by our standard benchmark program was not much better than that of the other drives in the field. On the other hand, sequential access of this expensive drive (\$2,995, plus \$545 for a controller) was superior.

Unlike every other hard disk drive for the IBM PC AT we looked at, this drive uses the ESDI (Enhanced Small Device Interface) standard, which transfers data between disk and controller at twice the speed of the interface used by the other disks in this report. This alone accounts for the doubling in performance in sequential access throughput.

The bottom line is an improvement on sequential transfers of data, such as program loading, and programs that load and store large amounts of data at a time, such as large word processing and spreadsheet files.

Another benefit of the ESDI interface is that the drive does not start until the controller commands it to spin. This lets you install two drives without exceeding the power supply's 7-amp limit.

We would expect to see far greater performance improvements in random access under a multitasking and multi-user system such as Xenix, which provides parallel processing. This drive looks like a good bet in such an environment.

Pros: Fast seek time, double sequential throughput. **Cons:** Requires additional hard disk controller.

Core International, 7171 N. Federal Highway, Boca Raton, FL 33431; (305) 997-6055.

EXECUTIVE
SUMMARY

All these drives provide similar performance under MS-DOS, all self-park, and all but one have complete shock mounting.

The Tandon TM755 receives our nod as the drive of choice in a very close decision. We considered noise level, ease of interfacing to existing AT controllers, and the half-height form factor. This also makes a reasonable second drive for the user needing more space.

For multiuser operating systems, we prefer the Core AT40F drive for its outstanding performance. We suspect that much of the advantage this drive offers is wasted in the MS-DOS, single-processing environment.



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Let's face it, the whole point of backing up your hard disk is to defend your valuable data against accidental loss. Sure, you can buy a cheaper backup utility — or one with a lot of fancy "bells and whistles" — but that won't bring back a single byte of lost data when you really need it.

FASTBACK® is a sleek, powerful program designed for *one purpose*: to make the *fastest, safest* backups possible. And nobody does it better. That's why the majority of Fortune 500 companies are

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FASTBACK's® phenomenal speed is a legend in its own time, backing up a full 10-megabyte hard disk in just 8 minutes flat — or twice that speed on the IBM-AT and compatibles! Plus, FASTBACK's® full wildcard naming conventions let you selectively back up and restore individual files, directories and subdirectories. And in incremental mode, you can make a daily backup of just those files created or changed since your last full backup, usually in less than a minute!

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So, now that you know why FASTBACK® is still shooting down the competition, why wait any longer? Get FASTBACK® today!



**Fifth Generation
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raditionally, the market for hard disk drives for the Macintosh has been limited — only now showing promise as businesses start to view the Macintosh Plus as a “real computer.” As a result, more vendors have been entering the market and sell-

ing more drives, so prices of Macintosh drives have started to drop.

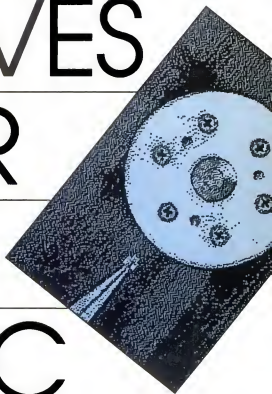
This price decline has also been helped by the increased acceptance of the Small Computer System Interface (SCSI, commonly pronounced “scuzzy”). This inexpensive interface, used in the Macintosh Plus, can transfer data at up to 4 megabytes per second, more than enough to handle even the 25-megabit-per-second drives still in development.

In addition, external SCSI drives offer several advantages over internal units. For one, each drive comes with its own controller, so you don’t have to worry about whether your controller can talk to a particular drive. Since they include a power supply, there is no worry about whether the power supply can handle the load. The disadvantage of SCSI drives is the higher cost of packaged drives compared with bare drives.

External SCSI drives also let you chain together up to six devices, providing additional storage capacity. All you have to do is ensure that the first and last devices in the chain have their terminating resistor packs intact — you have to remove the terminating resistors from all the other devices. Because of this consideration, we discuss here how easy or hard it is to get at them.

The performance of the Macintosh drives we studied varies widely — much more so than the seven AT-class disks we examined. Moreover, only two of the following six drives have two features we consider important: self-parking heads and complete shock mounting. These omissions are especially surprising when you consider ►

HARD DISK DRIVES FOR THE MAC PLUS



BY STEVEN SATCHELL

that many vendors offer tote bags for their drives, providing ready portability.

In all cases, we set up the drive according to the provided instructions. We also evaluated how easy it is to change the SCSI drive address and disable the terminating resistors should you want more than two SCSI devices.

Rodime 45 Plus

Rodime has both a 20-megabyte and a 45-megabyte hard disk system for the Macintosh Plus and Mac SE; we looked at the \$1,595 45-megabyte drive. We were very impressed with the performance turned in by the drive. This was also one of the drives with shock mounting and self-parking.

Getting at the terminating resistors

was the only sore point we found in this otherwise excellent drive. This is because you have to remove the cover to get at the resistors, and that process was extremely difficult. Details on opening the case would have been helpful. After that, the rest was simple.

Pros: Fast performer, self-parking, good shock mounting. **Cons:** Poor access to terminating resistors, expensive.

Rodime Inc., Peripheral Systems Division, 29525 Chagrin Blvd., Pepper Pike, OH 44122; (216) 765-8414.

CMS 40

This is the only hard drive in our evaluation with a handle. The \$1,495 \$40 is small, yet it proved to be a nimble performer when connected to the Macintosh Plus.

There is also a SCSI adapter available for the IBM PC.

This drive is ideal for the businessman who needs to ship large quantities of data quickly and easily, and does not want to invest in telecommunications. It is also useful when security demands that data be locked up overnight. The drive fits in a standard office file cabinet (we tried it).

The SCSI ID is easily set by switches on the back of the unit.

This drive has two drawbacks: One is that you cannot remove the terminators. In the case of CMS, the effect on the user becomes rather complicated. With SCSI drives from most vendors, terminators that cannot be removed force the drive to be the first or last unit in a SCSI chain. This is not necessarily true with the CMS drive, as long as you remember two things:

• All the drives in the chain must have their terminators installed.

• None of the drives can be an Apple product (because of the way Apple has implemented the SCSI standard).

The other drawback is the use of nonstandard connectors on the SCSI bus. While this doesn't pose a problem with the Macintosh Plus, it could prove incompatible with other SCSI hosts that strictly adhere to the SCSI standard.

Pros: Portable, self-parking, shock mounting. **Cons:** Unable to remove terminating resistors, nonstandard connector.

CMS Enhancements Inc., 1372 Valencia Ave., Tustin, CA 92680. (714) 259-9555.

Mirror Technologies Magnet 40/40

Mirror Technologies' Magnet 40/40 is the only drive in this evaluation that incorporates a 40-megabyte streaming tape backup, a wonderful idea.

At \$2,795, the Magnet 40/40 sells for \$400 less than the combined price of Mirror's comparable disk drive and tape backup units. (The drive alone sells for \$1,795.)

What's unusual about this product is that it has two terminators: one for the disk, which can be disabled via switch, and one in the tape drive. This setup means this unit *must* be at either end of a SCSI chain.

In addition, the disk drive of the Magnet 40/40 is self-parking and is equipped with shock mounting — both important features.

Pros: Tape backup, self-parking, shock mounting. **Cons:** Restricted placement at the end of a SCSI chain.

Mirror Technologies Inc., 2209 Phelps Road, Hugo, MN 55038; (800) 328-6795.

Apple Hard Disk 20SC

This is Apple's disk drive for its Macintosh Plus. It is also the slowest Macintosh hard disk in the group, based on our benchmarks.

There are no terminating resistors in this \$1,299 drive. Instead, you must buy separate terminators from Apple (\$30 each); you then install one on the Macintosh and the other on the last peripheral in the SCSI chain. While having separate terminators entails additional cost, it does make the process of adding drives a lot more convenient.

Unfortunately, Apple's drive is not self-parking (although Apple claims the drive on the Macintosh SE and Mac II will be self-parking).

Pros: Shock mounting, external terminator. **Cons:** Slow drive, terminators purchased separately, drive does not park itself.

Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.

Jasmine Direct Drive 20

At \$579, including a cable and backup software, the Jasmine Drive 20 is among the least expensive Macintosh Plus and Mac SE hard disk drives we found on the market.

The drive's performance is also quite respectable, holding its own against the more expensive brands. The only critical feature missing is the capability to park itself when power is turned off. It does have good shock mounting.

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		EGA Card	EGA Card	Graphics Card
		Mouse	Mouse	Mouse
Minimum PC Hardware Cost	\$1,200	\$2,300	\$2,300	\$2,100
Software Price	\$695	\$695	\$895	\$7,000
Minimum PC Investment	\$1,895	\$2,995	\$3,195	\$9,100
Speed (Print 1 Text Page)	1 Min.	4.5 Min.	5.0 Min.	NA
Startup/Learning Time	1 Hour	1 Hour	2 Hours	2 Hours
Number of diskettes	12	5	11	9
Max. Number Pages	Unlimited	128	100	999
Font Types Provided	45	7	4	NA
Font Editing	Y	N	N	N
WYSIWYG	N	Y	Y	Y
Pushbutton Document Generation	Y	N	N	N
Multicolumn Page Setup	Y	Y	Y	Y
Multipage Setup	Y	N	Y	Y
Max. Num. Text Cols/Page	72	20	8	40
Text Flow & Page Numbering	Y	Y	Y	Y
Header & Footers	Y	Y	Y	Y
Style Sheets	Y	N	Y	Y
Text Positioning Accuracy (Inch)	.001	.01	.01	.001
Table Generation	Y	Y	Y	Y
Tab	Y	Y	Y	Y
Leading & Kerning	Y	Limited	Y	Y
Macros	Y	N	Y	Y
Form Overlays	Y	N	N	N
Font Downloading (Any Font)	Y	N	N	N
Font Cartridge Support	Y	N	N	N
Graphics Interface	Y	Y	Y	Y
Built-in Graphics	Y	Y	Y	Limited
Number Fill Patterns	72	17	9	11
Rectangles	Y	Y	Y	Y
Circles/Ovals	Y	Y	Y	N
Free Format Graphics	Y	Y	Y	N
Screen Dump Capability	Y	N	N	N
Batch Printing Mode	Y	Y	Y	Y

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Only two of these six drives have two essential features: self-parking heads and complete shock mounting.

Of the six drives, the Jasmine is the only one that lets you reach the terminating resistors through an access plate. Although this is not as handy as Apple's separate terminator, it does eliminate opening the drive for any reason.

In addition, the Jasmine was the only Macintosh drive to include a fan and air filter. This prevents the circuit boards as well as the drive from getting dusty, improving the life of the unit.

Pros: Low cost, good access to terminator resistors, air filter, shock mounting. Cons: Not self-parking.

Jasmine Computer Systems, Jasmine Technologies Inc., 555 De Haro St., San Francisco, CA 94107; (415) 621-4339.

Supermac Data Frame XP20

Supermac offers its Data Frame drive in two sizes, the \$1,299 20-megabyte drive tested here and the 40-megabyte drive (reviewed February 23). The Rodime 45 Plus now beats both these drives in our random access tests, but the Data Frame drives still take the prize in sequential access.

The most unusual aspect of the XP series of drives is that it lets you set SCSI ID (setting up the drive as "drive C," for example) by software — no switches, no need to open the case.

Although access to the terminator resistors is easy (take off the cover, unplug the ribbon cable, then plug out the resistors), the manual states that this task must be done by an authorized Supermac dealer. This is annoying, especially in view of how easy the task is.

We also found it ironic that the vendor supplies a tote bag for this drive when the drive heads aren't self-parking.

Pros: Fast performer, effective convection cooling, software sets SCSI ID. Cons: Not self-parking, no instructions for removing terminators.

Supermac Technology, SMS Co., 950 N. Rengstorff Ave., Mountain View, CA 94043; (415) 964-8884.

EXECUTIVE SUMMARY

Choosing a hard disk for the Mac Plus from the above list of six is quite simple. The Rodime 45 Plus is not perfect, but it offers the best blend of features: Its performance is outstanding, its heads are self-parking, it comes with built-in shock mounting, and it fits nicely underneath the Macintosh.

The cloak-and-dagger people will do well to look at the CMS S40 drive. Even though the Supermac drives are easier to stuff into a file cabinet, we view their lack of self-parking as a detriment.

EVALUATED HARD DISK DRIVES FOR THE MACINTOSH PLUS

Product	Apple 205C	CMS S40	Jasmine Direct Drive 20	Mirror Tech Magnet 40/40	Rodime 45 Plus	Supermac XP20
Price	\$1,299	\$1,495	\$579	\$2,795	\$1,595	\$1,299
Self-parking	No	Yes	No	Yes	Yes	No
Shock mounts	Yes	Yes	No	No	Yes	Yes
Width (inches)	9.7	6.0	10.1	9.7	9.7	3.0
Height (inches)	3.1	6.0	2.7	3.4	3.0	8.0
Depth (inches)	10.4	10.0	10.0	14.5	9.5	9.5
Power (watts)	60	7	40	35	60	60
Benchmark sequential*	1,286	1,334	1,655	1,345	2,445	2,783
Benchmark random*	1,061	3,595	2,007	2,180	4,440	2,082
Manufacturer's Specifications (in milliseconds)						
Seek: track-to-track	20.00	10.00	20.00	18.00	7.00	15.00
Seek: average	65.00	29.00	65.00	65.00	28.00	68.00
Seek: full	150.00	50.00	150.00	215.00	62.00	150.00
Latency	10.93	8.33	8.33	8.33	8.33	8.33
*Relative to the CMI 20 running in the IBM PC AT Model 99 - 1.0 (InfoWorld Hardware Benchmark System)						

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First Look

By Michael J. Miller

Latest Multimate Merges Features of Office, Professional Word Processors

I've never been a big fan of the so-called "office word processors." Typically modeled on dedicated word processors, these programs are usually large and feature-filled, but often I have found them slow and cumbersome.

The alternative has been "professional word processors," programs that are almost as feature-filled but faster.

Now, perhaps due to the success of Word Perfect in both markets, we're beginning to see the two categories merge.

The latest version of Multimate — the prototypical office word processor — is the best example of this. Multimate Advantage II takes the basic character of Multimate and adds to it a new user interface and several options that make it more acceptable to people like me, who write long, often unstructured, documents.

The biggest change in the user interface is the addition of an optional pull-down menu system, similar to the ones used in Framework and the Dbase III Plus Assistant. You get from the regular full-screen Multimate menus to the pull-down menus by typing Alt-L (the more traditional menu keys were already

used for other functions). Within the menu, you use the right and left arrows to move within major topics and the up and down arrows to choose a particular command. The optional system is hidden well enough so the experienced Multimate user need never see it.

Another change is the addition of a Document mode that lets you see the end of one page and the beginning of the next, as opposed to the Page mode in which you work with one page at a time. It's still not a true document orientation — it does not dynamically show you your page breaks; instead, you have to enter a fairly slow Repaginate command.

Some aspects of the user interface still seem a bit awkward to me. For instance, the program uses function keys and Alt-Control key combinations.

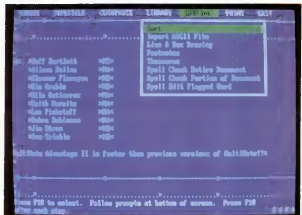
On the numeric keypad of an IBM PC keyboard the "+" sign is used to insert a single character, the "-" sign to delete a single character, and the "*" to restore deleted text. Frankly, I'm used to those keys working as IBM intended. When I tried to undo text, I kept finding myself accidentally pressing the Shift key (resulting in a print screen) or

the Control key (resulting in a "hot print"). Also, I had to be very careful hitting the F10 key as it not only completes a function but also saves the document and returns you to the main menu. Finally, I think the two-step spelling-correction process (flagging all the incorrect words, then correcting them) is more difficult than the one-step process used by most other high-end word processors.

Beyond the user interface, Multimate II adds a host of new features, more than I can discuss here. One great idea is the capability to merge data directly from Dbase files. All you have to do is indicate the name of the file, the fields you want, and what conditions you'd like met.

It adds an "infinite"-level undo of any previous deletions, a Preview feature that shows you how your pages will look when printed, Wordstar and DCA conversion, full DOS path support, a "hot key" to DOS, and an in-document sort. In addition to repile, a file manager previously sold as add-on has been improved and included in the base package.

Several ideas make it faster to start and finish a document. You can type "WP" and the



Multimate users can select functions from a pull-down menu.

name of the document and start typing. Previously, you had to get in through the word processor's main menu. Once you've finished your document, you can print it quickly with "hot print," a single keystroke that prints the page.

All these features seem designed to keep Multimate competitive, and for the most part they are successful.

The only actual problem I had was with the "keyboard accelerator" feature that speeds

up scrolling and repeating characters. It was too fast, in fact, on an ALR Access 386 (where every character we struck repeated infinitely) or even an IBM PC XT with an old Data Desk keyboard (where an unwanted repeated character appeared every 40 or 50 keystrokes). In those cases, Multimate was unusable. It worked fine on a standard PC XT with an Enhanced PC keyboard. The solution on the other machines was to turn off the accelerator option from the Util program or to slow down the responsiveness. I can't blame Multimate for the compatibility problems, but I can wish that the solution was documented, particularly since the firm knows both the problem and the solution.

Multimate Advantage II is among the most expensive word processors — \$564 for 5¼-inch disks and \$595 for both 5¼-inch and 3½-inch disks. I like the "Personal Use Extension" to the license agreement that licenses you to use Multimate on whatever computer you'd like if it's the only copy in use at that time. This extension is free until the end of the year and \$25 thereafter.

The program requires an IBM PC or compatible with at least 384K of free memory after you load DOS and any RAM-resident programs. It is not copy-protected.

Multimate Advantage II seems designed as a product for corporations to standardize on. It includes just about all the features anyone needs, and the features generally work quite well. Multimate users will love it. As for me, I'm still not convinced.

Multimate is available from the Multimate International division of Ashton-Tate (20101 Hamilton Ave., Torrance, CA 90502; [213] 329-8000).

First Look examines new personal computer products before they have been through a formal review.

PS/2 Machines Could Affect Strategies of Apple, Sun, DEC

IBM's PS/2 announcements will affect more than just the clone makers. They may also have a profound effect on how Apple, DEC, Sun, and other micro-computer and engineering workstation vendors conduct their business.

In all the hoopla over the IBM machine, it's easy to forget that with the Macintosh II, Apple has already introduced a machine that's at least as technologically advanced as IBM's Model 80 machine.

The Mac II has the 68020 central processor, which is approximately as powerful as the 80386, and it comes with a math coprocessor (which will be an option on IBM's Model 80). That gives it processing power that's addressable now by current applications. No 640K limit, no waiting for a new operating system. Similarly, Apple already has a graphics-based operating environment, and the Mac II offers graphics and colors that far exceed IBM's new VGA standard. In addition, Apple has announced a version of Unix for the Mac II that supports both System V and Berkeley extensions, which should make the machine compatible with engineering workstation software.

However, the Mac II has two main drawbacks. The less important one is a lack of multi-

tasking under the current operating environment. Even with Switcher, only one application at a time can actually be running. However, OS/2, which will be IBM's true multitasking solution, won't be here for quite some time, giving Apple room to catch up. The Jaguar environment seems to be a large step in this direction.

The second drawback is the most important: The Mac II is not compatible with the IBM world. True, announced add-in boards will put an 80286 in the Mac II, and you could theoretically put in chips to emulate the video and all the other peripheral stuff, and then you could theoretically run OS/2, but I don't know if this will work.

There's no easy answer here, but Apple can do a few things that would aid the coexistence of the two machines.

A few years ago I suggested that Apple should make an external 3½-inch disk drive that connects to the Macintosh. I'm not sure I need to run MS-DOS on a Mac, but I'd sure like to read my PC files without having to use communications software or a network. Mac software vendors understand why this is important, but the hardware just hasn't caught up.

Apple has now said it will make a 3½-inch drive available,

but the firm still sees it as part of its concept of running DOS. Remember that the new IBM models all read and write 720K 3½-inch disks, while the Mac Plus, SE, and II all use 800K 3½-inch disks. It's tough to get an IBM drive to read a Mac disk (primarily because the Macintosh drives require some unusual hardware), but it doesn't seem that difficult to get a Mac drive to read from or even write to a 720K disk. It would be an all-software solution that would be faster, simpler, and cheaper than anything we have today.

To those of us who spend most of our time working with microcomputers, it's easy enough to believe that IBM was mainly concerned about Apple and about the clone makers. But in the big picture, DEC is more of a worry to IBM.

The recent announcements give IBM weapons against DEC in two key areas. One area is engineering workstations, where a 386-based Model 80 could be the basis for a competitor to the Microvax and Vaxstation lines. Some real work would be required — such as larger screens, a real version of Unix, and some porting of applications from the 68000 family to the Intel family — but it could happen if IBM's internal policies allow it.

The other area is communi-

cations, where IBM's OS/2. Extended Edition and its SAA connections seems to closely follow DEC's successful connectivity strategy of having all its machines run the same software. Remember that DEC has positioned itself primarily as a communications firm, offering better connections between micros, engineering workstations, minicomputers, networks, and mainframes. IBM's strategy could be a threat.

By going after communications and engineering workstations, IBM could threaten DEC, but first it has to prove it can deliver, both in the engineering workstation and communications arena, where DEC still has a commanding lead.

In the meantime, a combination of DEC with Apple or Sun could block IBM by offering both good communications and a range of machines including high-quality, low-cost, already-compatible workstations.

(Think of what a DEC-Apple combination would do to Sun. It would give DEC a machine that could compete with the Sun in performance at a lower price and give Apple distribution in engineering markets where DEC and Sun have been strongest.)

Whether this will all come to pass, I don't know, but it's sure interesting to speculate.

"The Datacopy 730 remains the premier low-cost scanner for the PC." — *PC Magazine*

September 30, 1986



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Software Reviews

Multiplan's worksheet size is one of the largest on the market, and spare memory management makes efficient use of worksheet space.

REVIEWS SCORING

InfoWorld reviews only finished, production versions of products, never beta test versions.

All products receive scores ranging from unacceptable to excellent in various categories. We then weight the scores in different categories (giving the most weight to the performance and value categories) to produce an overall numeric score for the product. Scores should be judged as follows:

- 10 — Excellent 9-10: — Taps in its class
- 9
- 8 Very Good 7-8.9 Offers special benefits
- 7
- 6 Satisfactory 5-6.9 Meets essential criteria
- 5
- 4 Poor 3-4.9 Falls short in essential areas
- 3
- 2 Unacceptable 1-2.9 Fails to meet minimum standards
- 1

Multiplan, Version 3.0 Spreadsheet Offers Multiuser Support for LANs Features, Speed, Competitive Price Add Up to Superb Value

By Don Crabb Review Board

Microsoft's Multiplan spreadsheet has already good; now it's better. The latest version (3.0) improves upon its predecessor by offering LAN multiuser support, faster performance, and more features.

The program still lacks graphics and simple database capabilities (features offered by both Lotus 1-2-3 and Supercalc 4). But Multiplan 3.0 has improved its speed of operation so that it is approximately as fast as 1-2-3 in recalculation. And because a LAN version of 1-2-3 is not yet available, Multiplan 3.0 offers particular advantages for those looking for a network product. Last, makes it a superb value.

FEATURES:

Multiplan 2.0 already offered a large worksheet size (4,095 rows by 255 columns), support for the Intel 8087 and 80287 math coprocessors, keyboard macros, enhanced model consolidation, and built-in mouse support. It also had an expanding cell pointer, could read and write 1-2-3 files, used a sparse cell-memory-management technique, and had a recalculation method that improved apparent performance dramatically.

Version 3.0 adds more features and refines others. Keyboard macros have been improved by allowing you to record more easily your keystrokes and commands to create macros on the fly. You can now audit your worksheets with a built-in auditing function that will verify formulas, examine the relationships of cells and worksheet statistics, and identify the ranges of cells and macros that you want to validate.

Multiplan now lets you have up to eight windows open simultaneously. You can see eight views of the same worksheet, one view of eight worksheets, or a mixture. To enhance the multiwindow display, Multiplan 3.0 lets you resize individual cells to be from zero to



Multiplan 3.0 gives you up to eight windows. Here four horizontal windows plus a boxed window show various parts of three linked worksheets on a LAN.

64 characters wide.

You can now enter dates and times into cells and can use them in calculations. These are made easier by more than two dozen new built-in functions.

When it's time to print your worksheets, Multiplan 3.0 gives you more control over their appearance than before. You can add to your reports customized headers and footers, page numbers, and date and time stamps. With the data encryption command, which scrambles files using a password that you select, Version 3.0 can also help protect your data from unwanted examination.

Besides these new worksheet features, Microsoft has added several new general features, the

most important of which is LAN support. You can now use Multiplan 3.0 as either a stand-alone, single-user program or as a multiuser program on LANs compatible with DOS 3.1 or higher. This includes IBM's PC Network, Microsoft's MS-Net, AT&T's Starlan, 3Com's 3+, Corvus' Omninet, Ungermann-Bass' NetOne, Novell's Netware and Advanced Network, Orchid's PC-Net, AST's PC-Net, Fox's 10-Net, Nestar's Plan, and DEC's DEC-Net. Version 3.0 also supports network hard disks and shared printers. A copy of Version 3.0 installed in a read-only directory on your LAN server will permit simultaneous access by any number of PCs connected to it.

Besides LAN support, Multiplan 3.0 can also read and write ASCII files, dynamically size the screen's height, and run DOS commands from within the worksheet.

PERFORMANCE:

We tested Multiplan 3.0 on a stand-alone, 8-MHz IBM AT with 1 megabyte of RAM, a 30-megabyte hard disk, and a floppy disk. We also installed Multiplan as a multiuser system on an IBM AT (with a 40-megabyte hard disk and 1 megabyte of RAM) serving as a LAN server running Novell Advanced Netware for a group of connected ATs.

Multiplan's worksheet size is one of the largest on the market, and spare memory management uses worksheet space efficiently. If this size (1,044, 225 cells) limits your model building, worksheet-linkage features, such as consolidating data on a cell-by-cell basis to build 3-D models, increases capacity more.

The most important performance improvement over Version 2.0 is the LAN support. Installing Multiplan on a network file server lets you distribute such tasks as worksheet updating, model creation and modification, and others across the network. You can consolidate that information into one worksheet. It is nearly impossible to come up with a number that measures this value, and it won't show in the results of disk access times, CPU cycles, or worksheet recalculation speed. Instead, you measure it by improved productivity.

The capability to distribute spreadsheet work across a LAN is much more important than you might think. For example, in preparing your annual operating budget, you typically gather your information from a number of people who may be using different spreadsheets to prepare their figures. So you have to go through the hassle of importing that data into your program even before you can

INFO WORLD REPORT CARD

SOFTWARE MULTIPLAN VERSION 3.0

7.9

	Unacceptable	Poor	Satisfactory	Very Good	Excellent
Performance	☐	☐	☐	☐	☐
Documentation	☐	☐	☐	☐	☐
Ease of Learning	☐	☐	☐	☐	☐
Ease of Use	☐	☐	☐	☐	☐
Error Handling	☐	☐	☐	☐	☐
Support	☐	☐	☐	☐	☐
Value	☐	☐	☐	☐	☐

SUMMARY

Microsoft's Multiplan 3.0 spreadsheet adds multiuser support for DOS 3.1-compatible LANs. For the IBM PC. Not copy-protected. Pros: Fast in calculation, file handling; background recalc feature; LAN support; excellent documentation; data encryption; good price. Cons: No graphics, data handling; needs more RAM than Version 2; LAN file locking not very sophisticated.

PRODUCT DETAILS

List price, \$195. Version tested (3.0) available for the IBM PC, XT, AT, and compatibles. Add network user pack (\$95) for each LAN user. Requires MS-DOS 2.0 (single-user), DOS 3.1 or later (multiuser). Requires 256K of RAM, one floppy drive. Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073; (800) 426-9400, (206) 882-8088 in WA.

Also Included
In This Section

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start to make sense of it. Each time you want your coworkers to provide an update for your model, you have to repeat this tedious process. The employees also have the same problem of trying to analyze changes to your consolidated model.

With a multiuser spreadsheet, you can make Multiplan 3.0 available over the LAN server to all users, who use the program to create their worksheets and do their individual analyses. When the budget cycle becomes critical, you access their individual worksheets directly and consolidate them in a larger model that represents the entire budget. Further, you can make this consolidated worksheet available over the LAN so that others can verify your figures, your model, and the relationship of their analyses to yours.

Multiplan's file access over LANs prevents multiple read/write access for a single file. The first person on the LAN to open a particular file is allowed universal read/write access to that file during that work session (unless the file has been protected with a password or made read-only or invisible at the DOS level). All other users on the LAN who open the same worksheet will automatically be granted read-only access; they can read the data or save a copy under a new name in their own directories.

As handy as the multiuser access capabilities of Multiplan 3.0 are, they still come up short compared with those of Open Access II (reviewed December 22, 1986) and Smart Software (reviewed April 27). Both programs let you protect individual sections (groups of cells) of worksheets, not just entire worksheet files. You can also allow multiple read/write access to sections so you can create a large worksheet model and let different users have read and write access to different parts of the model. Multiplan 3.0 lacks this powerful feature, though you can use the cell-locking feature to protect specific cells against unintended alteration.

Unlike Multiplan 2.0, which used a separate utility program to convert external files, Multiplan 3.0 directly can use data created by most popular spreadsheets, as well as standard ASCII text files. After brief practice, we read Dbase II files, Syk files, Lotus 1-2-3 files, and ASCII text files. We could also convert files to ASCII, Syk, and 1-2-3 format so they could be used by other programs.

Of course, one problem transferring files to and from different formats arises when functions and features are available in the sending program but not in the receiving program; the nontranslatable function is converted as a value rather than as a formula, leaving you to perform a greater or lesser degree of editing, converting, or model rebuilding in the receiving program. Because Multiplan 3.0 has more functions and features not found in Lotus 1-2-3 (or Symphony), we found this to be more of a problem when saving Multiplan 3.0 worksheets into 1-2-3 format than when converting 1-2-3 files to Multiplan. Extensive editing is required to convert worksheets with large numbers of macros involving functions having no 1-2-3 counterpart.

We were pleased with Multiplan's performance, whether we used it as a stand-alone program or over the Novell LAN. For our benchmarks, we tested Multiplan 3.0 as a single-user product. One thing Multiplan 3.0 does very quickly is loading files. It loaded our test files considerably faster than either Lotus 1-2-3 or Supercalc 4, and at about the same speed as Silk. Lotus 1-2-3 recalculated our simple test file faster than Multiplan 3.0, but not by much. Multi-

plan introduced with Version 2.0 a background recalc feature that gives it a real bonus not reflected in our scale test: Unlike most other spreadsheets, Multiplan will recalculate and update the screen first, then recalculate the remainder of the file in the background while allowing you to continue making changes on-screen (as long as those changes don't affect the course of the recalculation). This means you can get on with your work while those on other spreadsheets are still waiting.

To test Multiplan on a LAN, we measured the effects of multiple invocations of Multiplan from the server on individual performance. We timed how long it took to start a spreadsheet and to save one to a hard disk (local and LAN server). We also timed worksheet recalculations and iteration until convergence on a solution (using both fixed and variable numbers of iterations).

These operations over the Novell LAN were always slower than when we used Multiplan as a single-user product. But they did not become significantly slower until we had more than five workstations active on the LAN, each accessing the LAN disk. When we really taxed the LAN — by running 10 workstations at once, all using Multiplan, all accessing files from the LAN disk — things slowed to the point where the system was virtually unusable. But we were not surprised at this since many other programs we've tested have reacted the same way.

Multiplan 3.0 was fast enough at the minutiae involved in editing and updating spreadsheet models that we usually didn't notice it. Performance was simply never a limiting factor as long as we kept our LAN traffic at a reasonable level when accessing disk files. As a stand-alone program, 3.0 really cooked.

Printing LAN documents is often a performance bottleneck; happily, this is not so with Multiplan 3.0. You set the output device for your worksheet using the Print Options command. This device may be any local or LAN printer. Multiplan thoughtfully advances the paper to the next page automatically after a worksheet or report has finished printing, thus clearing the printer for the next user.

Printing begins as soon as the request is initiated rather than after the Multiplan session has ended (a significant improvement over LAN software that requires you to exit the program first). Multiplan keeps the setup information for printing (print options, borders, and such) and screen setup data in a local initialization file. This file lives in the home directory of the startup disk for each PC on the LAN, allowing each machine to maintain custom parameters for initializing hardware when Multiplan 3.0 loads.

In sum, when compared with the competition, Multiplan recalculates our test file somewhat slower than 1-2-3 but faster than either Silk or Supercalc 4. Multiplan lacks the graphics and simple database capabilities offered by Supercalc, which also has a networked version. Smart Software and Open Access offer more advanced networking capabilities.

Multiplan's bonuses over Lotus include the background recalc feature, built-in auditing, and good LAN support that allows you to parcel out your number-crunching work among users on your network. For these benefits, we rate it a very good performer.

DOCUMENTATION:

Like everything else about Multiplan 3.0, the printed and on-line documentation

exudes professionalism and care. The multisectioned *User's Manual* compares well with any first-rate manual we've read in the last year. Divided into tutorial, reference, and appendix sections, the manual covers all the information about learning and using Multiplan.

A good table of contents and index are included. Reading through the manual, you'll be impressed by its competence, good use of examples (including many diagrams and illustrations), and easy-to-read style. A separate quick-reference guide supplements the manual, summarizing the important commands.

The on-line documentation is equally well-done. At any point in Multiplan, you can request help by highlighting the Help Menu command or by typing a question mark. You can also highlight a menu command and get help about it. Screens of context-sensitive information will then be displayed. You can also page through the on-line help on the screen.

Because the documentation has no weak spots and is top-drawer work, we rate it excellent.

EASE OF LEARNING:

Multiplan 3.0 was also easy to learn. We opened the package, copied and loaded the program disks, and started the program, all without looking at the documentation.

Installing the program, which is not copy-protected, onto the LAN server was just as painless and quick. Although the disks lack the sample worksheet files of Version 2.0, or an on-line tutorial, the tutorial in the manual was effective at getting a spreadsheet- novice colleague from startup to model creation in less than an hour — quite an accomplishment. Multiplan 3.0 proved to be a gem at ease of learning, and we rate it very good.

EASE OF USE:

Multiplan still uses an interface that incorporates both screen menus and direct commands — an interface that differs from 1-2-3's and that has been much criticized. However, once you get accustomed to Multiplan's command organization, you're not likely to have much problem with it.

In addition to the commands found in Version 2.0, Multiplan 3.0 adds the handy Run command for running DOS commands directly from the program.

You can invoke each command by using the space bar to highlight a menu item or by typing the first letter of the command at the prompt. Below the command prompt menu, Multiplan lists some status information about the current worksheet.

Although the Microsoft command/menu interface still isn't our favorite, it works, it's fairly easy to figure out, and it won't get in your way much once you're moving down the track at full steam. On the positive side, the windowing feature makes it especially easy to use large files and multiple files, and the Run command makes DOS access easy. For these reasons, we rate ease of use very good.

ERROR HANDLING:

Multiplan 3.0 proved practically bullet-proof, even over a LAN. The program just won't let you do foolish things without verifying that you are really serious. We weren't able to crash Multiplan or lose our data with any of our usual test shenanigans (except when we unhooked network cables — LANs definitely don't like that sort of thing). Multiplan supplies good error and warning messages, in addition to protecting against mistakes. A section in the manual

gives additional explanation on the error messages. Error handling was flawless in our tests, so we rate it excellent.

SUPPORT:

Microsoft has a mixed reputation for customer service. Half the time you can get through immediately when you call, and the support staff is terrific. Half the time you get a busy signal, or you get lost in the electronic telephone system, or the staff is too new to the product.

We've been able to determine no pattern. Our experience with Multiplan 3.0 was all positive. Microsoft's product support staff provided excellent telephone technical support. Support is available from 5:30 a.m. to 6 p.m. Pacific time. The number is not toll free.

Multiplan 3.0 is not copy-protected; this is important with a LAN product, where copy protection schemes can prove particularly nettlesome.

It comes with the standard 90-day warranty only on the disk itself. Microsoft keeps you informed about product upgrades, usually making them available to current owners at a substantially reduced cost.

Because of our actual experience with the excellent phone support and because of the lack of copy protection on this networking product, we rate support for Multiplan 3.0 very good.

VALUE:

Here's how pricing for Multiplan works. For \$195, you get one copy of the program, which you can use as a single-user product or which you can install on a file server. For each extra concurrent user on the network, you are required to buy a network user pack (basically just a manual) for \$95 each.

The competition, while more full featured, will cost you more. For example, a LAN version of Supercalc 4 has recently become available. But one copy of the program lists for \$495, and you'll have to lay out an additional \$495 to buy a LAN pack that lets you add three extra users, at \$165 for each additional user. The extra cost gets you a spreadsheet with graphics and a file manager.

Open Access charges \$395 per user (or as low as \$200 per user with 10 stations). For this price you get a spreadsheet with graphics and data management, plus a relational database with a database language, a word processor, and a communications module. Smart Software, which likewise offers several modules in addition to a full spreadsheet, is more expensive, priced at \$895 for the basic pack plus \$595 per workstation.

Lotus 1-2-3 is a different story. As of press time, Lotus still had not announced a LAN version of 1-2-3 (although a networking version is rumored to be on the way). So it's out of the running in this area. You can, of course, use it as a single-user product on a LAN; but if the software isn't written for a LAN, you run the risk of losing data or creating a spreadsheet that you can't access later, in addition to being unable to have multiple users access the same worksheet. And you'll still pay \$495 per user.

Although Multiplan 3.0 lacks the rudimentary graphics and data handling commands of its competition, it is less expensive (in some cases much less expensive) and offers a fast spreadsheet package with powerful multiworksheet consolidation and linking capabilities. For that reason, we rate it a very good value.

Don Crabb is the director of undergraduate computer science instruction and teaches at a major Midwestern university.

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Pro 3D for the Mac

3-D Program Is Better Suited
For Business Than Engineering

By Ken Milburn Review Board

Usually considered a part of CADD (computer-aided design and drafting), the process for 3-D imaging is more like modeling with clay than drawing a plan with a T-square and protractor (as in 2-D drafting). Suppose you want to create the figure of a man: You create a cylinder for the body; smaller cylinders for the neck, arms, and legs; a sphere for the head; and so forth. You continue to fashion the parts and use tools to sculpt the details until you come up with a recognizable figure.

Pro 3D is the electronic equivalent that allows you to "sculpt" your models for desktop publishing, sales presentations, slide shows, and other business applications. It is a turbo-charged edition of the most popular surface modeling package for the Apple Macintosh, Easy 3D, also from Enabling Technologies. They share the same interface design and

quite obviously as a sun, on Pro 3D's gray scale.

Similarly, the usual Macintosh window title bar and icons have been replaced by a darker gray frame containing icons for spinning, rotating, squeezing (vertical or horizontal), redrawing, and homing your sculpture to its original position.

The Create menu lets you enter one of four geodesic spheres or a cube. This may seem like too few primitives (basic drawing shapes), but the program is adept enough at reshaping, slicing, and carving to let you create just about anything imaginable.

Also on the Create menu are Pro 3D's aptly named power tools: the Profiler and the Lathe. The Profiler is a cross-sectional modeling tool, which lets you create an outline and then introduce different cross sections or "ribs." You can individually modify the ribs by extruding them to any length, for example, or add and move points and rescale the ribs to modify the object along its longitudinal axis. There is a wire-frame preview mode so you can check on the progress of your model.

The Lathe lets you draw a radially symmetric object. You start by drawing a partial outline, then the lathe spins on an axis to create a cylindrical or spherical object. The effect is similar to spinning a chair leg on a shop lathe.

These "power tools" are far more versatile than their Easy 3D counterparts, which only allow you to define an object according to the length of its parts and which have a limit on the number of ribs you can define.

Another welcome addition is the mirroring of objects (or partial objects in the Lathe and Profiler) across any of several axes, so you can create and rotate objects in various orientations—north to south, east to west, northeast to southwest, for example.

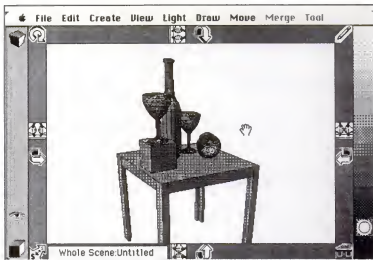
The View menu lets you choose the side of the scene on which you want to work. A change made in one view is automatically reflected in all the others (although you won't see a change made to the front from the back, for instance). You can also split the screen into quarters and see Camera, Top, Left, and Front views simultaneously.

You can add to the dimensionality of your object with the extensive list of choices for lighting: normal (three-fourths source with fill), twilight (low front), overhead, flat, silhouette (back light), opposing (butterfly), and wire frame (no shading). You can keep the wire frame on or you can turn it off at any shading mode. If you don't like the menu choices, you can define your own custom lighting.

Draw isn't a menu of drawing tools. Instead, it toggles the drawing conditions: automatic redraw, outline, shade, perspective, and wire-frame thickness.

The Move menu lets you lock movements to vertical or horizontal, center the scene, or show units of measurement or movement in pixels. More significantly, it contains powerful commands for aligning objects with one another or with any XYZ coordinate.

The Merge menu can be used to make one object out of two—they can be



With Pro 3D, you can use a hand icon in the Camera View to pan the window around the scene until you get it framed in the most flattering way.

touching, overlapped, or at a distance from one another—or it can be used as a sculpting tool, subtracting all or part of the shape of one object from that of another.

The Tool menu allows you to set and toggle a nonprinting grid and axis crosshairs to aid in visual location, and set and measure dimensions. New features that help you in accurately proportioning models are: Point placement by XYZ coordinates, alignment to absolute reference axis in the universe, and adjustable curve generation and smoothing. And you can now use a hand icon in the Camera View to pan the window around the scene until you get it framed in the most flattering way.

Pro 3D makes a quantum leap over Easy 3D features in desktop publishing capabilities, modeling flexibility, and scaling accuracy. Drawings can be output to other paint, draw, or CAD programs for further enhancement. Or they can be sent directly to Postscript devices for high-resolution printing (up to 2,500 dots per inch, depending on the output device). You can also specify page placement and orientation, along with adjustable printed graphic size.

As already mentioned, Pro 3D lacks some features for heavy technical applications, including 2-dimensional drafting capability, "real-world" dimensioning, auto-dimensioning, the capability to print output larger than legal size, fill patterns, the capability to type labeling text, freehand drawing tools, and the speed necessary for heavy production work. Of course, you can combine it with other programs to fill in these blanks (except speed), but that's not where the strength of Pro 3D lies; Pro 3D provides more sophisticated modeling tools for applications that aren't strictly technical.

PERFORMANCE:

Thanks to the number of calculations involved in modeling 3-D surfaces, any program of this type will seem agonizingly slow compared to other types of applications. For example, a complex "anti-matter" merge, which causes one object to carve a hole of that shape from another object, took over half an hour on one occasion. But it's all relative: We've seen Autodesk 2.5 running on an IBM PC AT take several hours to generate a hidden-line wire-frame model.

Having said that, Pro 3D is amazingly fast at redrawing the scene. Most screen redraws take only 10-30 seconds, depending on the complexity of the scene.

What spoils Pro 3D's impressive

speed is the fact that it regenerates the entire screen each time you make even the tiniest addition, edit, or move. After 30 or 40 15-second waits, you feel as though you're slugging through quicksand. You can turn the redraw feature off but only in the Camera View—even more maddening since this is not the mode for editing. Other programs, like Mac 3D from Challenger Software, redraw only the affected portion of the universe.

When we balance speedy modeling and extensive, powerful features against the aggravation of constant redrawing, we find performance satisfactory.

DOCUMENTATION:

The manual is sizable and seems professionally organized and designed, but the type is too small. We found a number of typos and omissions such as the following excerpt:

"The origin is a critical reference point for outline editing, since it represents both the three-dimensional center of the universe.

The tutorial is done in real cookbook style, step by step, leading you by the hand. But the instructions often assumed that the reader knew to take an intermediate step or two. Basically, the manual relies a little too heavily on information that you may have learned several steps ago and probably will not remember without sufficient repetition. And contrary to the text, the screen doesn't display editing changes in all four views simultaneously.

The table of contents, index, tutorial, and hints for advanced users are all there, but there are no reference cards or keyboard overlays. These would be helpful, since the program offers many keyboard shortcuts.

What saves the documentation from a poor rating is a pretty good (save for the omission of a step or two) tutorial. It gives you a hand-held tour through the creation of a "scene" that utilizes all of the program's essential features in real-world context. Although a bit wordy, it's good enough that there won't be much of an aftermarket for "How to Use Pro 3D" books.

We give Pro 3D's documentation an "A minus" for effort and a "D" for attention to detail. Since the essential information is there and the tutorial more stimulating than most, we judge the documentation satisfactory.

EASE OF LEARNING:

Thanks to the instinctive screen redrawing

What spoils Pro 3D's impressive speed is that it regenerates the entire screen each time you make the tiniest addition, edit, or move.

algorithms. But significant enhancements in Pro 3D make it possible to create ultra-complex sculptures.

FEATURES:

Pro 3D does not perform 2-D drafting, nor does it claim to compete with programs that do. Because it lacks some of the capabilities necessary for heavy production work, it is not likely to find favor in the professional technical arts, such as engineering and architecture. As a consequence, Pro 3D relies some of the traditional drafting metaphors that seem alien to non-draftsmen—and Pro 3D finds its niche: It seems just right for office use in applications that are more business oriented in nature than they are technical.

When you load Pro 3D, you get the feeling you've left Macintosh country—but have only just passed over the border (Canada, perhaps). The top-line menu is there, but after Apple, File, and Edit, the pull-down categories assume less familiar names: Create, View, Light, Draw, Move, Merge, and Tool.

You open in Camera View—odd, because in order to start work, you have to be in Top, Bottom, Left, Right, Front, or Back View. The traditional tool palette has been replaced by a gray bar with an eye in its middle and cubes at its head and foot. You can alter perspective by mousing the eye up and down between the cubes. Pro 3D projects scenes in true perspective, with adjustable foreshortening. And you can alter light intensity by sliding the icon, marked

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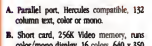
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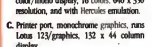
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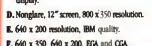
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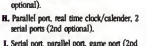
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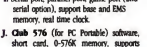
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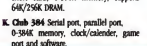
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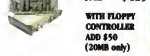
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and the wordiness of the tutorial, it took us three days to work through the tutorial. The organization and titling of menus is not consistent with the look of other Mac programs. They are, however, logical and appropriate to the program's purpose, which is a good thing because there is no on-line help.

The curious thing is that once you've made it through the tutorial, it's easy to remember how to put the pieces of a scene together. We credit the eccentric interface for that. Non-draftsmen will feel more comfortable with this interface than with the more traditional and Mac-compatible approach used by Challenger Software's Mac 3D. So we'll award Pro 3D a satisfactory rating for ease of learning.

EASE OF USE:

Pro 3D turns out to be surprisingly easy to use once you've learned it. Pro 3D's unconventional approach means that, since we've had considerable experience with 2-D drafting systems and 3-D systems based on them, it took us longer to get used to Pro 3D than it would take someone with less experience. Most office workers who want to illustrate laser-published materials won't run into that cultural barrier. Pro 3D makes it easier for inexperienced sculptors to visualize how an item comes together because its "view" screens allow you to work on orthogonal (flat) views of the scene, one side at a time.

Programs like Mac 3D always work in Camera View. If you want to work in side profiles, you have to switch on orthogonal mode, then rotate until the side you

It's easy to use other graphics programs to enhance Pro 3D's images because file transfer paths are provided to the paint and draw (PICT) formats they use.

want to work on is precisely perpendicular to the face of the screen.

The Lathe and Profiler in Pro 3D also provide consistent views of the scene when you're working in those modes. That makes it easier to see and predict the results. The frameworks also force a logical sequence for building 3-D objects and scenes.

It's easy to use other graphics programs to enhance Pro 3D's images because file transfer paths are provided to the paint and draw (PICT) formats they use. This is an important capability if you don't want to see the geometric planes that compose all three-dimensional objects. You can also save a file to Postscript format, either normal or EPS compressed. So far, there's no translator to Microsoft's TIFF format, a capability that you might look for in a future release.

Some trade-offs between the convenience of this program and that of Mac 3D are worth noting. Mac 3D lets you implement all its shaping and editing tools at all times. You may have to turn to wire-frame mode to make modifications in Mac 3D, but you still haven't left the interface. In Pro 3D, you edit points to reshape an object except in the Profiler or Lathe. And in Pro 3D, you can zoom in or out only in Camera View. Pro 3D won't let you reduce or enlarge selected objects by a percentage of their total volume; rather you reduce or enlarge by either squeezing the object from side to side, then top to bottom, and then back to front or by extruding it in the same manner.

Neither program offers a macro language or other type of programmability. For "the rest of us," these are minor obstacles. Leaving room for improvement in those areas, we rate Pro 3D very good in ease of use.

ERROR HANDLING:

Pro 3D can easily generate drawing errors (the manual calls them "unexpected results") due to wraparound, refusal to merge two items properly, or hidden surface problems.

Seventeen pages of the manual are devoted to troubleshooting these problems and to instructing you on how to avoid them. These are not problems that occur in all surface modeling programs, so it's not inherent in the technology. At least error messages could warn you when placement was a problem. But there are only four error messages, and none address the drawing-errors problem.

The program always asks you if you want to overwrite the existing file when you save, and it also asks if you want to save when you quit. Deletes, conversely, happen instantly. Fortunately, you can undo them or paste the delete back in — if you think to exercise that option before doing anything else.

We've praised the power of Pro 3D's merge talents. But if you make a mistake in merging, the objects are glued together permanently. There's no Unglue or Explode command.

While the program definitely needs

some work in this area, none of these glitches is fatal. Because of the file protection and one-level undo, we rate error handling satisfactory.

SUPPORT:

The phone number for support is printed on the back page of the manual, but it's not toll free, and it's only active from 10 a.m. to 6 p.m. Central time. When we called, our questions were answered promptly, courteously, and knowledgeably. In one instance, research was required. We were called back within half an hour.

Pro 3D isn't old enough to be popular enough to have attracted a large library of third-party clip art. But the publisher does offer \$49.95 "Clip Object Libraries" of transportation (cars, buses, boats, trains, etc.), anatomy (male and female mannequins, heads, hands), and desktop publishing (3-D letters). You get your choice of one of these free for registering your program. If you buy the other two at the same time, you get a 25 percent discount (\$75 for both). We say get all

three of them: They'll save enough drawing time to pay for themselves in one or two sessions. The solid primitives that make up these drawings have not been merged, so you can easily modify them.

The warranty is on the media only. We're thankful that the publishers have chosen not to burden us with copy protection, but you do have to agree to a sublicense every time the program is loaded. After the 35th time you've said "OK," it gets annoying.

Pro 3D is also available in a \$595 Windows-based version for the PC.

The quality of the telephone support earns this package a score of very good in support.

VALUE:

While Pro 3D, at \$349, sells for \$100 more than its closest competitor (Mac 3D), has fewer features, is slower, and is more error prone, the program is really aimed at another market. Mac 3D is for technical uses such as architecture or structural engineering; Pro 3D's conceptual design, and especially its profiler, make it far better suited to business, desktop publishing, and graphic design applications, where the missing features are largely irrelevant. On balance, therefore, we rate Enabling Technologies' Pro 3D a satisfactory value.

Ken Millburn is a small-systems consultant and former president of a San Francisco microcomputer systems house; he has installed a number of professional CAD systems.

INFO WORLD THE WEEKLY REPORT CARD

SOFTWARE PRO 3D FOR THE MAC

5.5

	Unacceptable	Poor	Satisfactory	Very Good	Excellent
Performance	☐	☐	☒	☐	☐
Documentation	☐	☐	☒	☐	☐
Ease of Learning	☐	☐	☒	☐	☐
Ease of Use	☐	☐	☒	☐	☐
Error Handling	☐	☐	☒	☐	☐
Support	☐	☐	☒	☐	☐
Value	☐	☐	☒	☐	☐

SUMMARY

Pro 3D is a three-dimensional surface modeling program for the Apple Macintosh. Not copy-protected. Pros: Sophisticated tools; software well-suited for business use (desktop publishing, presentations, slide shows); easy to use. Cons: Not for heavy technical applications or precision drafting; weaknesses in documentation, error handling, inconsistencies with Mac conventions; though fast, auto redraw cannot be turned off.

PRODUCT DETAILS

List price, \$349. Version tested (1.0) available for Mac with 512K or more. Requires one disk drive. Uses Apple Imagewriter or Laserwriter. Includes Postscript outputs. Enabling Technologies Inc., 600 South Dearborn St., Suite 1304, Chicago, IL 60605; (312) 427-0408.

Software Index

Software Review Index appears monthly and quarterly, listing reviews for that preceding period. Date of full review is shown. List prices may change. For back issues, call InfoWorld customer service or (215) 768-0388 in Pennsylvania.

Appleshare (Apple) — Score: 6.8 — Version 1.0. Appleshare links Macintoshes over AppleTalk networks and shares files on a dedicated file server. Not copy-protected. List price, \$799. (4/20/87)

Ask Sam (Seaside Software) — Score: 7.9 — Version 3.02. A text database manager for the IBM PC. Not copy-protected. List price, \$200. (4/20/87)

Bedford Integrated Accounting (Bedford Software) — Score: 7.6 — Version 3.04. An easy to use entry-level accounting package for the IBM PC. Not copy-protected. List price, \$249. (4/6/87)

Electric Pencil (Electric Software) — Score: 4.8 — Version 3.0. An inexpensive low-end word processor for the IBM PC. Not copy-protected. List price, \$69. (4/6/87)

For Comment (Broderbund) — Score: 9.1 — Version 1.0. For Comment allows up to 16 reviewers to enter comments in a text file without affecting the original. Not copy-protected. For the IBM PC. List price, \$195 (1 author), \$995 (for networks, 16 authors). (4/27/87)

Formath (Shantha) — Score: 8.4 — Version 2.08. A technical text formatter for the IBM PC. Not copy-protected. List price, \$400. (4/20/87)

Harvard Professional Publisher (Software Publishing) — Score: 5.1 — Version 1.0. A desktop publishing program for the IBM PC. Not copy-protected. List price \$695. (4/20/87)

Hewlett-Packard Graphics Gallery (Hewlett-Packard) — Score: 6.4 — A business graphics program designed for use by executives. Not copy-protected. For the IBM PC. List price, \$695. (4/13/87)

Microsoft Word 3.0 for the Mac (Microsoft) — Score: 6.8 — Version 3.0. A high-end word processing program for the Macintosh. Not copy-protected. List price, \$395. (4/6/87)

Smart Software System (Innovative Software) — Score: 6.8 — Version 3.0. An integrated, multiuser package for use on PC LANs. Not copy-protected. List price, \$895; \$595 for each additional workstation. (4/27/87)

Superpaint (Silicon Beach) — Score: 8.2 — Version 1.0. An integrated paint/draw program for the Macintosh. Superpaint is not copy-protected. List price, \$99. (4/13/87)

Wordstar 4 (Micropro) — Score: 6.3 — Update of the classic high-end word processor for the IBM PC. Not copy-protected. List price, \$495 (upgrade, \$89). (4/13/87)

Write Now (T/Maker) — Score: 5.5 — Version 1.12. An ease-of-use, menu-driven word processor with spelling aids and a word-completion feature. Write Now is not copy-protected. For the IBM PC. List price, \$150. (4/27/87)

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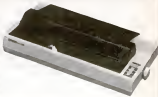


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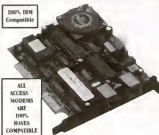
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Hardware Reviews

The Inboard gives a real boost to older hardware, improving both CPU and hard disk performance.

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Because of the volume of submissions, we regret we are unable to contact vendors regarding products not selected for review.

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Intel Inboard 386/AT

Add-In Board Breathes New Life Into Installed ATs

Product Offers Cost-Effective Way to Increase Performance

By Steven Satchell Review Board

You're a power user — you've got big spreadsheets to recalculate, large databases to sort, complex graphics to generate. Should you write off your 286 machine for the more alluring 386s coming to market?

Not necessarily. You can rejuvenate that AT with Intel's alternative — the Inboard 386/AT, an add-on board that transforms your AT compatible into a near 386. We found that the Inboard increased our 6-MHz IBM AT's CPU performance so dramatically that it actually beat the Compaq 386 in our speed tests. At the same time, it improved hard disk performance, though to a lesser degree.

FEATURES:

On a single, full-length, AT-compatible card, the Intel Inboard 386/AT offers a 16-MHz 80386, 64K of direct-mapping cache, and sockets for 1 megabyte of memory. It also has a socket for a math coprocessor and connectors for an additional 2 megabytes of RAM.

You install the board in a full-length slot in your AT. Then, using the supplied chip puller, you remove your system board's 80286 chip. Into the 80286 socket you insert the Inboard's tape-like cable. Two cables are currently available: One fits the IBM PC AT, and one fits some other AT-compatible systems, such as the Compaq Deskpro 286 and Tandy 3000, which use a different kind of chip carrier. The Inboard will not work with compatibles whose 80286 socket is not within reach of the board and its cable. On the AT&T 6300 Plus, for example, the 80286 chip is on the underside of the motherboard; the 80286 on the Epson Equity III Plus is close to the front of the computer, far from the slots.

Like the Above Board, the Inboard uses its own memory in addition to the system memory already on your computer. You can backfill system memory down to the 256K level; the larger the proportion of Inboard memory to system memory you use, the better performance you'll get, because the Inboard talks to its memory through a fast-

er, wider (32-bit) bus.

That 64K of cache RAM is one of the key elements in this product. The concept is simple: A single-level, direct-mapped cache of high-speed 45-nanosecond RAM stores copies of recently requested RAM data; if the CPU asks for the data a second time, the cache can deliver it faster than normal RAM (not only is the cache RAM faster, but the CPU is set up to talk to it at zero wait states, rather than the one wait state it uses to talk to its other 32-bit memory). The result is faster throughput. Intel claims that as much as 90 percent of all memory accesses can be satisfied from cache memory in real-life application programs. This boosts the overall CPU performance by 40 percent over an identical non-cache implementation.

When you buy the Inboard, you choose either an installation kit for the IBM PC AT or the one for compatibles. The IBM PC AT kit includes a crystal to speed up the basic system board timing for early ATs from 6 MHz to 8 MHz. This crystal is necessary for the computer system to keep up with the Inboard. The kit also includes the tools necessary to remove the 80286 chip and to install the cable.

With the Inboard, you also get a disk containing helpful software, including a device driver that lets you change, from the keyboard, the Inboard's speed from 16 to 8 MHz and back. You can also turn the high-speed cache on or off from the keyboard. In addition, there



On one AT-compatible card, the Inboard offers a 16-MHz 80386 and sockets for a megabyte of memory and a math coprocessor.

is an expanded memory manager that uses the 80386 paging registers to do what the Above Board does with dedicated hardware, thus giving you EMS memory for those programs that use expanded memory.

PERFORMANCE:

The Inboard gives a real boost to older hardware, improving both CPU and hard disk performance. In fact, our tests show that the Inboard has the best computing speed of all micro systems we have tested to date, including the Compaq 386 (see accompanying table). More importantly, Intel has pulled this off without raising the dreaded specter of incompatibility.

We ran our benchmark studies for the Inboard on the same IBM PC AT Model 99 (manufactured in January 1985) that we use as the baseline for our benchmark reports. This means

that any improvement in performance over the 1.00 baseline is directly attributable to the Inboard.

In compute-intensive processing, the Inboard ran on the whole 3.78 times faster than the 80286 chip running at 6 MHz, according to our consolidated CPU test results. The Compaq 386, by contrast, rated 3.46; we were surprised that an add-on board proved faster with the exact same chip. Apparently Intel's use of cache RAM makes a difference. The Inboard communicates with its own 32-bit on-board memory at a fast one wait state, with slower system memory at whatever slower speed is needed, but with its own 64K of 45-nanosecond cache RAM at zero wait states; the latter is what makes the difference in our CPU tests.

The Inboard improved computing power even for other boards. We tested it with a 6-MHz version of the Intel Above Board PS/AT expanded memory board, loading a spreadsheet that uses expanded memory. The spreadsheet recalculated in slightly more than half the time that it would have taken without the Inboard installed — this despite the fact that the Inboard is limited by the slow bus on the computer in how fast it can access other boards.

We were further surprised by the degree of improvement in the hard disk's performance. The Inboard upgrade doesn't upgrade your hard drive,

INFO WORLD THE PC NEWS WEEKLY

REPORT CARD

ADD-IN BOARD INTEL INBOARD 386/AT

8.0

Performance	☐	☐	☐	☐	☐
Documentation	☐	☐	☐	☐	☐
Ease of Use	☐	☐	☐	☐	☐
Setup	☐	☐	☐	☐	☐
Serviceability	☐	☐	☐	☐	☐
Value	☐	☐	☐	☐	☐

SUMMARY

A 386 speed-up board for the IBM AT and some compatibles, the Intel Inboard breathes new life into the installed base of ATs. **Pros:** Very fast CPU performance, speeds up disk and other components; 5-year warranty, good support. **Cons:** Difficult to install; documentation could be clearer.

PRODUCT DETAILS

List price, \$1,995 (base model with no memory), \$2,495 (with 1 MB RAM). \$2,940 (with 2 MB RAM). Includes 16-MHz 80386, 64K high-speed cache RAM, drivers, installation kit (cable). For the IBM PC AT and certain AT compatibles. Module for 10-MHz 80287 math coprocessor available (\$495). Intel Corp., 5200 N.E. Elam Young Parkway, Hillsboro, OR 97124; (800) 538-3373, (503) 629-7354 in Oregon.

of course — and, in fact, sequential access in our tests was basically unaffected. But with the different CPU, random access improved by more than 60 percent. This suggests how much software overhead there is (from the operating system and the disk drivers) in disk drive operations — overhead which a faster CPU can improve. Still, this is one tradeoff in upgrading instead of buying a full 386 system — you're not replacing the hard drive, so you are unlikely to match the drive performance on your souped-up AT that you can get on a Compaq 386.

We tested software compatibility. With CROSSTALK XVI (3.6) you must either patch Crosstalk or run it at the slower speed, thanks to a known quirk in that program. (The Intel documentation acknowledges this problem; you can get the patch from Crosstalk vendor Microstuff).

The copy protection in the earlier version of Framework II (1.0) also requires you to run at the slower speed to properly recognize the distribution disk as a valid key disk. Everything else that we tested — Desqview 1.30, Lotus Simulator 2.1, Framework II 1.1, Lotus 1-2-3 1A and 2.01, PC Talk IIIC, Program 16.01, Reflex 1.0, Sidekick 1.56A, Smartmont 2.1, and Windows 1.01 — worked flawlessly.

We also tested a collection of hardware devices and found no glitches at all. The slower AT bus serves as a choke on the high-speed Inboard, so most other add-in boards are unaffected by the CPU speedup. The one potentially sensitive board, the EGA card, is kept happy by a replacement EGA driver program provided with the Inboard. Our add-ins had no problems. Our ancient Hayes 1200B internal modem worked at all speeds without problems. The Fox Research 10Net network board also worked fine with the Inboard. With the software from the Inboard disk, we had no problems using the Above Board PS/AT as well. More importantly, the PC AT system board was not affected when we increased our AT's speed to 8 MHz using Intel's replacement crystal.

Intel claims that its Inboard will make

your programs run twice as fast as they would on an 8-MHz AT without the board. Since our benchmarks show the Inboard nearly quadrupling the performance of a 6-MHz AT, Intel's claim for 8-MHz ATs seems well founded.

The Inboard is the new, larger engine that breathes new life into older systems while protecting your existing investment in hardware and software. You're giving up a slot, you're not getting as much hard disk performance improvement as you would with a complete 386 system, and you're not replacing the AT bus structure (so other boards won't enjoy as much of a kick as they do on a 386); but these are offset by Intel's clever use of cache RAM, which actually gives you faster CPU performance than any 386 we've tested. We rate the Inboard 386 an excellent performer.

DOCUMENTATION:

Because the Inboard isn't easy to install, you should follow the manual word for word. You should also note carefully the correction sheet and make those changes in the manual before you start.

We suggest that you heed this suggestion, given on page 1-1 of the manual: "Let your dealer install the Inboard 386/AT." We were able to follow the installation instructions and successfully install our Inboard. But some sections were unclear and left us wanting further explanation or illustration. We especially would have appreciated a section describing how to properly crease the tape-like cable. We guessed, and so far it appears that we guessed correctly.

Once you get the Inboard installed, there is very little else to do. The only operator tools are the two-speed control programs. The first is a driver that lets you change the processor speed from the keyboard. The second is a program that lets you set processor speed from a batch file. These programs are well documented.

This board is difficult to install and the instructions did not quite make installation as clear as it could have been. Yet because the other sections are well-done, we rate the documentation as satisfactory.

INFOWORLD BENCHMARK TEST RESULTS FOR INTEL INBOARD 386 VS. SELECTED COMPUTERS

CPU measures main processor performance relative to the 6-MHz Model 0099 IBM PC AT. Hard disk performance is tested for sequential and random data access.

SYSTEM (Clock speed in MHz/(No. of wait states))	CPU	Hard Disk (sequential)	Hard Disk (random)
80286-BASED PCs			
IBM PC AT (6/1)	1.00	1.00	1.00
IBM PC AT (8/1)	1.37	1.17	1.40
IBM PS/2 Model 60 (10/1)	1.72	2.02	1.67
PC's Limited 12 MHz (12/1)	2.08	1.08	1.68
80386-BASED PCs			
ALR Access 386 (16/1)	3.09	1.11	2.59
Compaq Deskpro 386 (16/1)	3.46	1.40	2.79
Intel Inboard 386 (16/1)	3.78	1.03	1.65

SOURCE: INFOWORLD HARDWARE BENCHMARK SYSTEM

EASE OF USE:

Using the Inboard with existing software is quite a trivial task. The hardest part is getting older copy-protected programs to load initially before you change to the faster clock speed. If you are a Crosstalk XVI user and don't want to update or patch your copy, you can make a batch file that slows down the Inboard before loading Crosstalk.

Sidekick and the Inboard both use the same hot key. But you can change Sidekick's hot key or press escape to get rid of it.

The annoyances do not detract from the ease with which you can change the CPU's speed from the keyboard. Thanks to clean design and a high degree of compatibility with existing hardware and software, the Inboard is very easy to use, and we rate it very good.

SETUP:

If handling fragile \$200-to-\$300 components and putting stress on your system's main board makes you nervous, take heed of Intel's recommendation to have your dealer install the Inboard. We tried it, and we, too, think you should let the dealer do it. It is all too easy to break something when installing this product. (But remember, until your dealer has installed several Inboards, he will face

many of the same problems; don't sign any waivers.)

If you want to tackle the job yourself, here's the key: Work slowly and methodically, paying close attention to each word in the manual as you go.

The most difficult part of the installation, physically at least, was removing the 80286 chip from the system board. Ours has been in place since 1985, and it proved hard to wrench out. But we found no damage, not even a bent pin.

Once you get the board installed and working, you have another problem. The cable that connects the Inboard to your system board lays on top of intervening expansion boards. You must be careful not to catch the cable on something when removing and replacing the system unit cover. We made the mistake of not paying attention once and were very lucky not to yank the cable from its moorings. We felt that some kind of strap would be better.

We mention these problems as a caution for those who might want to install this board themselves. Because Intel makes it very clear that you should have your dealer install the Inboard for you, we do not downgrade for difficulties that users would face trying to install it. On the whole, we rate setup as satisfactory.

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SERVICEABILITY:

The Inboard comes with a five-year limited warranty. That's pretty impressive — most personal computers now in operation aren't five years old yet. If anything goes wrong, you take proof of purchase and the board back to the dealer from whom you purchased it. That dealer will exchange your defective board for a working one. An Intel spokesman said users could also return their board directly to Intel, which would provide a new board. Couldn't be easier.

If your dealer is unable or unwilling to help you with the Inboard, toll-free support is available from Intel technicians who are more than capable of guiding you to solutions to common (and some not-so-common) problems. Fixing our software setup problems. For example, took only one 10-minute phone call.

We examined the Inboard carefully and found that the weakest component is the tape-like cable that links the Inboard to the system board. This can be damaged by improper handling or accident and costs \$200 to replace. Other than that, we found the Inboard to be well-designed and well-made.

If a RAM chip goes bad, there isn't enough room between the RAM chips to use a standard chip puller. We found that a chip tool we fabricated for the Above Board PS/AT works with this board as well.

As long as you take some care with the cable, we think this product should offer years of trouble-free service. Intel backs its product with a lengthy five-year limited warranty and a capable toll-free support line. We rate serviceability as very good.

VALUE:

You can buy the Inboard for \$1,995 with no memory. You can go to your corner computer store and add your own 256K chips, or you can buy your memory from Intel. For an extra \$500 the Inboard comes with 1 megabyte of memory.

At \$2,495, for that configuration, this is a wonderful product for those people who already have a well-stocked IBM PC AT. It offers the computing power of a 386 machine, but it saves users from spending \$5,000 or more on a 386 system.

Since many noncomputer companies put personal computers on five-year depreciation schedules, buying the Inboard can extend your AT investment and still give you the horsepower the Intel 80386 offers.

Owners of early PC ATs — especially those that still have the infamous CMI 20 hard disk drives — should carefully consider some hidden costs in upgrading the older technology. First and foremost, the stacked 128-kilobit RAM chips used in the early ATs are getting harder and harder to find, with the price going up steadily.

Balance the lower cost of upgrading

with the Inboard against the likelihood that you will soon have to replace at least the disk drive and perhaps the disk controller, as well as a growing number of memory chips, to ensure reliable operation.

Also remember that some AT compatibles (the AT&T 6300 Plus, the Epson Equity III Plus) cannot accept the Inboard.

A final caution: At \$2,495, the Inboard 386 is expensive enough that if you don't already have an AT, it's probably not worth your while to buy a cheap one in order to expand with the Inboard. This makes the Inboard a poor choice for new system purchasers.

But for its intended market — the installed base of later-model ATs that uses 256-kilobit DRAM and a good disk drive, the Inboard is a good, cost-effective, compatible way of increasing performance greatly, while protecting your investment. For those users, we rate the Intel Inboard 386 as a very good value.

Steven Satchell has 15 years' experience as a systems designer and hardware product programmer.

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The Laserjet II

HP Back in the Driver's Seat With Its Expandable Laserjet II

By Keith Thompson Review Board

Hewlett-Packard got there first. When it introduced its Laserjet printer three years ago, HP created the low-cost laser printer market. The machine was fast, quiet, and able to mix a limited amount of text and graphics on a single page.

When competitors began narrowing the gap, HP responded with the Laserjet Plus. Now, with competing machines closing in on the Plus, HP has done it again: With its new Laserjet II, HP is once again in the driver's seat.

The new machine isn't faster than earlier Laserjets. Nor does it give you the sophisticated output you can get from more expensive Postscript-equipped printers. But where HP has pulled off its coup is the Laserjet II's much-improved output, documentation, and user interface. And by pricing its new printer at \$2,495, by letting you increase the printer's memory to 4.5 megabytes,

and by including an I/O expansion slot, Hewlett-Packard has made the Laserjet II a formidable competitor and a very good value.

FEATURES:

Except for the Hewlett-Packard moniker on the front, there is little to suggest that the Laserjet II is a descendant of the Laserjet Plus (see review, December 2, 1985). Gone is the boxy look; in is a low-profile, sleek machine with a slightly smaller footprint than its predecessor. The new machine weighs about one-third less as well.

The guts are different too. The most notable change: a new Canon SX engine that prints a markedly denser black than its predecessor. It's no faster than the earlier engine, but its output is better.

The Laserjet II comes standard with 512K of RAM, which should be suffi-

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REPORT CARD

LASER PRINTER HEWLETT-PACKARD LASERJET II

	Unacceptable	Poor	Satisfactory	Very Good	Excellent
7.6					
Performance	☐	☐	☐	☐	☐
Documentation	☐	☐	☐	☐	☐
Ease of Use	☐	☐	☐	☐	☐
Setup	☐	☐	☐	☐	☐
Serviceability	☐	☐	☐	☐	☐
Value	☐	☐	☐	☐	☐

SUMMARY

The newest Laserjet printer from HP offers improvements in just about everything except speed, thanks to a new Canon engine and a complete redesign. Recommended. Pros: Fastness; better output; LCD display makes it much easier to use; first-rate documentation; smaller and lighter; memory expandable to 4.5 megabytes. Cons: Base system has less memory than Ricoh 6000.

PRODUCT DETAILS

List price, \$2,495 (base model). Model tested includes 512K of RAM, two font cartridge slots, six built-in fonts, parallel and serial interfaces, one printer cartridge. Additional memory: 1 megabyte, \$495; 2 megabytes, \$995; 4 megabytes, \$1,995. Hewlett-Packard Co., 13111 Chinden Blvd., Boise, ID 93714; (800) 367-4772.

cient for those printing text, full-page 150-dot-per-inch (dpi) graphics, or half-page 300-dpi graphics.

Fortunately, HP has made it easy to add memory for those doing more memory-intensive work. Into that machine's memory expansion slot you can add a board increasing the printer's memory to 1.5, 2.5, or 4.5 megabytes. A Laserjet II with 1.5 megabytes will produce full-page, 300 dot-per-inch graphics and still have room to let you download fonts and forms; a 2.5-megabyte configuration (the version we tested) will handle full-page graphics in a multiuser environment; and a 4.5-megabyte configuration is suitable for those doing CAD/CAM or high-end publishing involving many fonts and much graphics.

By choosing among these memory options, you can tailor the machine very closely to your needs. We should mention that we have not seen another machine in the same price class that lets you add this much memory. (You can get up to 2 megabytes on the Ricoh 6000.)

Another significant addition to the Laserjet II is the I/O option expansion slot. This leaves open the possibility of your later adding a plug-in card from HP or a third-party vendor. HP has announced plans to ship this summer a high-speed interface for the DDL page description language. Already available from Extended Systems Inc. of Boise, Idaho, is a \$495 add-on board that lets three users share a Laserjet II.

Hewlett-Packard rates the Laserjet II at 12,000 copies per month. The new printer cartridge (or "electro-photographic cartridge" in HP parlance) is said to produce 4,000 copies, depending on the amount of graphics you print. This cartridge contains the toner, developer, and print drum.

You get more built-in fonts with the new Laserjet — six instead of the two included with the Plus — and two external font slots instead of the one slot on earlier Laserjets. These slots accommodate the standard Laserjet font cartridges.

And where the Laserjet was limited to a 30-point maximum type size, the Laserjet II can print as large as 655 points (9 inches). This is banner news.

The Laserjet II can now handle heavier paper stock than earlier models. The printer can take 35-pound offset stock, while the Laserjet Plus is limited to 24-pound stock. The Laserjet II also now outputs your printouts in the correct order; earlier machines gave them to you in reverse order.

PERFORMANCE:

When laser printers first hit the streets, users were impressed with their eight-page-per-minute speed, especially when compared to the speed of daisy-wheel printers. Today, particularly in sites where several people share a laser printer,

users are clamoring for printers that produce better quality output more quickly.

The Laserjet II satisfies one of these demands: The new Canon engine produces output that is measurably better than that from the earlier engine. Grays are more even, blacks are denser, and both text and graphics print more sharply.

Print speeds, however, remain unchanged. We timed how long the Laserjet II and the

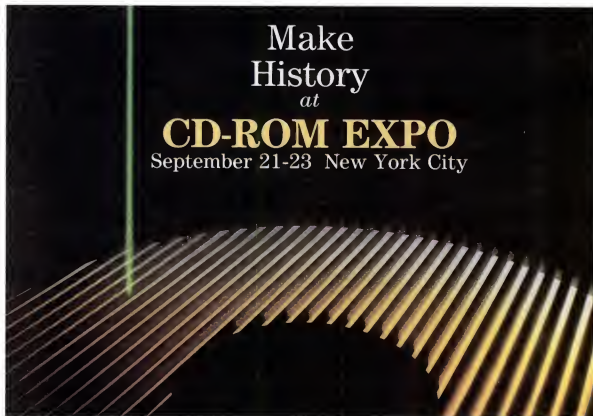
Laserjet Plus took to print our suite of test files, which include an all-text file, an all-graphics file, and a mixed text and graphics file. We also timed how long it took both machines to print 25 copies of a one-page, all-text file we created with Microsoft Word. In every case, the Laserjet II took less time to print the file as did the Laserjet Plus. Although HP rates the Laserjet II at eight pages per minute, the new machine print-

ed our best-case, all-text file at a rate of 7.7 pages per minute.

Only in its warm-up time is the Laserjet II faster — warm-up is down to 30 seconds from the 65 seconds the Laserjet Plus took.

The Laserjet printing command set is now supported by most popular software packages. And because this is the real thing, you don't have to be concerned with compatibility. We should point out that the

Laserjet II, like other low-end laser printers, does not currently support any page description languages, like Postscript, so you won't be able to get the more sophisticated output available from more expensive printers such as the Apple Laserwriter. The expansion slot, however, gives users the capability easily to upgrade to the announced DDL board or to yet-unannounced boards supporting the Postscript page de-



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IFW



With its additional memory expansion options and a font-cartridge slot, several users can share the Hewlett-Packard Laserjet II printer.

scription language, or other specialty drivers.

The extra font cartridge slot will be a boon to many. With two slots, the machine can draw on more font resources. Because the Laserjet II can use the same cartridges developed for earlier Laserjets, you can choose from among several hundred font styles and sizes.

Except for its warm-up time, the Laserjet II is no faster than earlier models. However, the 4.5 megabytes of memory the printer will accommodate, the markedly improved output quality, and especially the I/O expansion slot which opens all manner of performance possibilities, combine to earn the Laserjet II a very good rating for performance.

DOCUMENTATION:

The Laserjet II's documentation has been completely revamped with the user in mind. While the Laserjet Plus' manuals were technically oriented, the Laserjet II comes with two easy-to-read books.

The 125-page *Getting Started* manual is a step-by-step guide that tells you how to get the Laserjet II up and running in the shortest possible time. It is filled with clear explanations and illustrations that

make it easy for anyone to install the printer.

The second manual describes the printer in more detail. Each of its six chapters and five appendices is prefaced with a table of contents. The manual covers printer topics thoroughly, including lucid discussions of the Laserjet's convoluted control code language.

The appendices contain particularly informative explanations of printer messages and configurations for using the machine with popular applications like Lotus 1-2-3, Word Perfect, Dbase, and Symphony. A helpful glossary and complete index round out this document.

For programmers or anyone interested in more technical aspects of the Laserjet II, Hewlett-Packard has an optional technical reference manual.

Kudos to HP for giving the Laserjet II documentation that's a sight better than that for earlier Laserjet models. Because the documentation is thorough, clear, and complete, we rate the Laserjet's two manuals as excellent.

EASE OF USE:

The Laserjet II is much easier to use than many competing machines and than

earlier Laserjet models.

The Laserjet's cryptic two-character front-panel status display has been replaced with a 16-character LCD display that gives printer messages in English. Previously, you got an error message saying something like "16" and had to go digging through the manual to see what that was supposed to mean. Now, the machine flashes such hospitable messages as "toner low."

But the LCD does more than display warnings. Using front-panel control switches and the message display, you can set up configuration and printing specifications. For example, to set up the configuration for parallel interface, you enter the parallel command from the control panel. The LCD confirms the choice. You can also set up defaults for such functions as page length, character set, and the number of copies. You choose all settings from this panel — there are no DIP switches to fiddle with.

Paper handling is also notably improved. With the earlier Laserjets, you had to camp next to the machine so that you could empty the 20-page delivery tray. The Laserjet II now includes a 100-sheet delivery tray. The Laserjet II's feed tray is also now larger (200 pages vs. 100 pages on earlier Laserjets).

On earlier Laserjets, you had to walk behind the machine to manually feed sheets into the printer. Now you can insert sheets from the front. (For heavy or bulky paper, you can still feed the printer from the rear.)

You can easily fix a paper jam, should one occur. Because you can see the entire paper path when you open the machine, we were able to find and remove the errant pages quickly. (During the several weeks we tested the printer, only one paper jam occurred.)

The Laserjet uses a single expendable toner cartridge, which is easy to reach and replace; you pull it out like a drawer, insert a new one, and close the machine. This takes less than three minutes.

In our earlier review of the Laserjet Plus, we cited the difficulties in using the machine's wide range of features without having to tackle the HP Printer Command Language (PCL). Since then,

nearly all major software vendors have addressed the problem by including application-specific printer drivers for the Laserjet. This has reduced the need for users to know any of the complex command codes the Laserjet uses. For those who do need to know some PCL, the new documentation makes it easier to learn.

Ease of use is the area where the Laserjet II has most improved upon the Laserjet. Because of the front control panel, the LCD, clear documentation, and improved paper handling, we rate ease of use as very good.

SETUP:

It takes about a half hour from the time you take the Laserjet II out of the box until you get your first printed page.

The Laserjet comes standard with both parallel and serial interfaces. The interface you use depends on having the appropriate port available in your PC, having the proper cable, and then configuring the printer using its front-panel configuration menu. The explanations and illustrations in the manual leave little doubt about how to set up the printer. We rate setup as very good.

SERVICEABILITY:

Hewlett-Packard has improved its support policy since we reviewed the Laserjet Plus. Although users are encouraged to contact their dealers if they encounter difficulties or printer malfunctions, the Laserjet II manual now includes a "Laserjet Hot Line" telephone number. (This is available from 7 a.m. to 4 p.m. Mountain time.) We found the support representatives quite knowledgeable.

The Laserjet incorporates several internal diagnostic tests that can help isolate a suspected component failure. A front-panel switch will test the built-in controller and produce a test printout. These tests are valuable for a user who isn't sure whether the printer or the PC is causing a certain problem.

Hewlett-Packard offers a one-year warranty on parts and labor. Printers bought from a dealer must be returned to that dealer for repairs. If you buy your printer directly from HP, you can take it

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One reason to buy from a company like HP is its reputation for quality and service. Because of this reputation, built-in diagnostics, one-year warranty, telephone support, and dealer network, we rate serviceability as very good.

VALUE:

For \$2,495 — and we've seen street prices as much as 30 percent lower — you get the basic Laserjet II, which comes with 512K of RAM. You could save several hundred dollars and buy a lower-end laser printer such as the QMS Kiss or the Okidata Laserline 6, both of which list for \$1,999. But these machines come with less memory, are slower, have fewer or no front cartridge slots, and their engines are rated for a lower duty cycle.

In the same price class as the Laserjet II is the Ricoh Laser 6000 (\$2,395). The Ricoh lists for \$100 less than the HP and

offers twice the memory standard (1 megabyte vs. 512K).

But the HP betters the competition for several reasons: It is rated a full two pages per minute faster and offers a second font cartridge slot. But it's the Laserjet II's expandability that makes it a better value. You can increase its memory up to 4.5 megabytes; the Ricoh can go up to 2 megabytes. Most important, though, is the HP machine's I/O expansion slot. In it you can plug the forthcoming HP DDL card, gaining the benefits of that page description language and access to DDL-compatible typesetting equipment. Should DDL fail to catch on, perhaps a Postscript add-on card will become available; and should Postscript somehow go by the way, you could add a board letting you run the Laserjet II with whatever Postscript's replacement is. In sum, you get flexibility and a safeguard against obsolescence. For that reason, the Laserjet II is a very good value.

Keith Thompson is the editor of two microcomputer newsletters for small business and the author of The Microintosh Office.

Micron King's Bishop Board

For EMS, AT Memory Board Proves a Less-Than-Ideal Mate

By Steven Satchell Review Board

Memory in your computer is like money in your pocket: The more you have, the easier life is.

The King's Bishop Board from Micron Technologies promises mega-memory: a standard 4 megabytes of extended expanded RAM to let you go from 640K on your AT or compatible. Yet the King's Bishop Board is compact, with a couple of versions — including all that memory without daughterboards. Depending on which model you select, you can run the boards at speeds ranging from 6 MHz with zero wait states up to 12 MHz with one wait state.

This is a board of extremes. On the one hand, as extended memory the board delivers Users of Unix or V-Disk will find it superior, especially if they own a fast-slot AT compatible, and it's very reasonably priced. But if you're thinking of this as an EMS board, forget it — Micron simulates expanded memory in software, and it's just too slow.

FEATURES:

This is one of the few memory boards that offer more than 2 megabytes of RAM without resorting to piggyback cards. The King's Bishop Board comes standard with 4 megabytes of RAM and plugs into any 16-bit IBM PC AT slot. Four boards let you populate an IBM PC AT or compatible system up to 15 megabytes. As a standard feature, the RAM array includes parity protection (which you can easily disable). If you have more than 640K of base RAM, the board can "backfill" conventional memory to the 640K mark.

Two versions of the card give you a performance choice: The Model 1306Z (\$895) works with systems supporting 6-MHz/zero wait state access (6/0) as well as 8/1, 10/1, and 12/1; the Model 1308Z (priced at \$995 with 4 megabytes) runs at 8/0, 10/1, and 12/1. Note that if you own a PC's limited 286/12, a 12-MHz machine whose slots run faster than

those in other machines, the King's is one of the only memory boards capable of keeping up. (See our review of the PC's Limited machine, February 9.) Virtually all other AT compatibles run their slots at the same slow speed.

We evaluate here the high-speed Model 1308Z King's Bishop Board. Both models include all memory on one board by putting them in ZIP packaging that takes up less space. Also available are comparable versions of the board that put memory into less expensive, more conventional DIP packaging; since it takes up more room, only 2 megabytes fit on the motherboard — the other 2 megabytes are put on a daughterboard. The 1306Z with daughterboard sells for \$795, and the 1308Z sells for \$895. The 1306 and 1308 motherboards alone (with 2 megabytes) sell for \$495 and \$595, respectively.

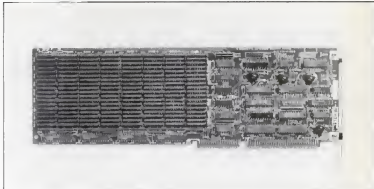
Diagnostics, an EMS simulator, RAM disk software (which uses memory as if it were a disk drive), and a printer spooler for MS- and PC-DOS are included. The simulator uses extended memory to simulate expanded (EMS) memory.

PERFORMANCE:

As an extended memory board for users of Unix or large RAM disks, the King's Bishop Board is nothing short of superior. As a substitute for paged memory boards like the AST Rampage and Intel Above Board, however, it comes out looking rather sickly.

Extended memory is memory above 1 megabyte that can be used on an 80286 or 80386 computer in native mode (with Unix or some other operating system that makes full use of the 80286 or 80386), or that can be used as a RAM disk by MS-DOS (which uses the 80286 as if it were an 8088 and therefore can't make direct use of more than 640K).

With universal success, we plugged this board configured as extended memory into a variety of systems; the IBM PC



Micron King's Bishop Board is compatible with high-speed slots and offers 4 megabytes of extended memory for AT machines, but its simulated EMS is slow and unwieldy.

AT Model 99, IBM PC XT Model 286, Epson Equity III Plus (at 10 MHz/one wait state at the slots), AST Premium 286 (at 10 MHz), PC's Limited 286/12 (at both 6 and 12 MHz), and an AT Access 386 computer system. In each of these systems the Micron board ran flawlessly — as an extended memory board.

Using the Epson Equity III Plus as our test system, we compared the performance of the Micron King's Bishop Board with our well-worn Intel Above Board PS/AT. It was no contest.

The PS/AT RAM disk ran rings around the Micron. Using our standard benchmarks, we found the RAM disk performance in sequential access more than three times faster on the PS/AT than on the Micron board. Of course, even as slow as the Micron board is, it's still nonetheless three to 10 times faster than a hard disk drive, so performance in this mode is still quite acceptable.

Next, we tested EMS memory by running Framework II, Version 1.1 and a 10,003-cell spreadsheet that we've used to measure performance of other expanded memory boards. Ten thousand of the cells generate random values between 0 and 1, while the remaining three cells calculate the average, standard deviation, and variance of the others.

Plugged into an Equity III Plus running its slots with four wait states, the Above Board PS/AT recalculated the spreadsheet in 2 minutes 17 seconds. We then installed the King's Bishop Board, setting up the Equity to access its slots at 10 MHz with only one wait state. The Micron board took 108 minutes to recalculate the same spreadsheet. This is not a viable alternative as an EMS board.

The 50-fold difference can only be explained by the shortcomings of simu-

lating EMS memory in software instead of implementing it directly in hardware. The software overhead necessary to manage the simulation means that page swaps are taking milliseconds instead of microseconds when the task gets big enough, those milliseconds add up to phenomenally large timings.

There is a dangerous wrinkle with simulated EMS that you do not find with EMS hardware. Depending on the application program you're running, you can find data changed in unpredictable ways, leading to errors in your results. In its documentation, Micron gives Javelin as an example of a program that can be run with EMS simulation software because it expects the EMS hardware to be available to protect data integrity. Micron says this is the only program that they know with this problem.

What would be a satisfactory performance rating for a capable extended memory board is overshadowed by the appalling performance of the Micron King's Bishop Board as EMS memory on an AT. Since there is more demand for EMS than for extended memory, we must rate the King's Bishop Board as poor in performance.

DOCUMENTATION:

The user's manual for the King's Bishop Board is a good refutation of the "more is better" theory of installation instructions. Unfortunately, in the attempt to keep the manual neat and slim, some of the more esoteric concepts, such as "DMA to extended memory," are tossed out without explanation. If you read carefully and follow the recommendations, you should have no problems getting this board and software working.

Users familiar with the Config-Sys file

INFO WORLD REPORT CARD

ADD-IN BOARD MICRON KING'S BISHOP BOARD

4.3

	Unacceptable	Poor	Satisfactory	Very Good	Excellent
Performance	☐	☒	☐	☐	☐
Documentation	☐	☐	☒	☐	☐
Ease of Use	☐	☐	☒	☐	☐
Setup	☐	☐	☒	☐	☐
Serviceability	☐	☐	☒	☐	☐
Value	☐	☐	☒	☐	☐

SUMMARY

Cramming 4 megabytes on one board, the King's Bishop Board is great if you use it as extended memory — and terrible as EMS. For the IBM PC AT and compatibles. Pros: Very fast; will keep up with 12-MHz/one wait state slots; inexpensive; well-made; money-back guarantee. Cons: EMS simulated in software; much too slow.

PRODUCT DETAILS

List price, \$895 (Model 1306Z, 6 MHz/zero wait states; 8/1, 10/1, and 12/1), \$995 (Model 1308Z, 8/0, 10/1, 12/1). Other configurations available. Includes 4 megabytes of parity-protected RAM, EMS simulator, RAM disk, printer spooler, diagnostics. Micron Technology Corp., Systems Group, 2805 East Columbia Road, Boise, ID 83706; (208) 386-3800, (800) 642-7661.

Simulating EMS With Software

When you try to simulate with software the expanded memory specification for hardware, you run into a problem. To understand the problem, we need to understand how hardware EMS boards, such as those made by Intel and AST, do their job.

Up to megabytes of high memory are broken into a number of physical pages (memory locations on the board) of 16K each. On program request, a selected physical page is mapped into one of four logical page locations in regular memory reserved for this purpose, so the microprocessor — which can't talk directly to the expanded memory — can access the data. Think about a business telephone system with four outside lines and a number of extensions: The computer can access any four out of the many pages of RAM at any given instant, changing pages by dialing the correct extension.

This analogy extends, to some extent, to conference calls. Nothing in the hardware prevents the multiple logical pages from mapping in the same physical page; just as a person on an extension of a phone system can make a conference call to two or three outside people. The way EMS is designed, the data aren't copied into the logical pages; instead, the logical pages contain pointers that keep track of the locations of the actual data stored on the EMS board. When the program changes data in one logical page, the pointers cause that change to be made directly in the physical page in EMS, so it is instantly reflected in any other logical page mapped (pointing) to the same physical location (just as all the people in the conference call can hear what is said by all parties).

An EMS simulator doesn't use pointers; instead, when a page map is requested, the software moves the actual data from the physical memory (disk or extended memory) into the logical pages. There is no longer a connection between the logical page data and the original data; once the data in the logical pages are changed, it must be written back to the higher memory (which is also why a simulator will be slower in operation).

The danger comes when the program requests the same physical page in the four logical pages; initially, all the pages contain identical information — until one page gets changed. The simulation software has no way of knowing when data on one logical page have been changed, and so it can't make corresponding updates to the other logical pages. The result is the same problem you sometimes get on a networking system when you use software that doesn't support file locking: If many people open the same file, they can all make changes without the others knowing; the most recently saved version is the one that ends up back on the disk, which may not be what was intended.

will have no problems following Micron's instructions; the newcomer will end up needing a lot of time to figure things out.

Some important information is buried. Autocad users might have a hard time finding the warnings that apply to them. We suggest Autocad users read the manual before using this product.

Some reasonable examples would help give novices confidence. Also, important information, such as warnings, should be located where the user installing this package will see it before blundering into the problem. But in spite of its "techie" orientation, the documentation makes it possible to set up and use the board, so we rate it satisfactory.

EASE OF USE:

Only the print spooler software requires

operator controls. The rest of the package lets you set and forget. This is characteristic of memory boards now available.

The print spooler program gives a good status report on current operations, but if you have trouble remembering commands there is no convenient help list to which you can refer. This omission is offset somewhat by the program's remarkably broad vocabulary; for example, it recognizes "purge," "flush," and "empty" as synonyms to discard characters in the print buffer. However, the entire word is not checked, only the first three characters. This may be confusing for those used to certain commands; for example, "reset" would be interpreted as "restart," which resumes printing.

Missing is a utility to show you how much expanded memory is available after loading programs. Such a utility

would be handy, though Intel's PS/AT and the AST board do not include one.

We rate ease of use as satisfactory.

SETUP:

This board is ready to be plugged into most systems right out of the box. Setting up the hardware is fairly straightforward.

Micron doesn't give you any installation aids for installing and configuring the software that comes with the board. If you've never installed a RAM disk or EMS driver before, expect the process to take 10 minutes. Old hands at installation shouldn't require more than five minutes to get everything going. Note that some other board makers automate the process of installing software.

The manual covers the meaning of the DIP switches very well. You need to mess with these only when installing the board

3M data cartridge available in five



for the first time, or if you add or remove other boards from your system.

A painless and (in most cases) switch-less installation procedure offsets the lack of automatic installation for the software drivers, and earns the King's Bishop Board a satisfactory in setup.

SERVICEABILITY:

We were quite impressed with the design and manufacturing engineering that has gone into the board. Fitting eight banks of 18 RAM chips onto one AT card is not an easy task.

Micron offers a two-year limited warranty on the King's Bishop Board. Should anything go wrong during the first two years, you ship the board at your cost to Micron Technologies in Boise, Idaho. Micron then returns the repaired board to you. Micron also backs its board

with a 30-day money-back guarantee.

Although Micron's technical support number is not toll free, we found we could get quick and correct answers to our questions about the board.

We don't expect trouble as long as you are careful about static electricity during installation. Clean design and flawless manufacturing give the impression of a board that will work very well.

If you should have a RAM failure during the life of the 4-megabyte single-board models, though, you are out of luck. ZIP packaging, required because of the tight spacing precludes the use of sockets on the board, is soldered, so if you should lose a chip, the entire board has to be sent in for servicing, which is an inconvenience. If this worries you, you can turn to the motherboard-daughter-board models, which use traditional DIP

packaging that allows individual chips to be removed and replaced by the user.

Micron provides what appears to be a superior diagnostic to ensure that the RAM chips on the board are in good shape and the switch settings are compatible with the computer system. We were able to use this diagnostic to trace problems in our test setup and experiment to discover the board's limits.

Despite the inability to replace individual failed RAM chips easily in the single-board model, the very competent design and manufacture and the money-back guarantee earn this board a very good score in serviceability.

VALUE:

Although this is billed as an "EMS memory" solution, the King's Bishop Board is in reality an extended (80286

protected mode) memory board with software simulation of EMS. As an EMS board, this is not a good solution, even though it is the only EMS board we've seen so far that can keep up with the fast bus on the PC's Limited 286/12 machine. Our experiences with Framework II show that this board is simply not worth considering for EMS on an AT.

But for those who need extended memory (for very large RAM disks or for use with a protected mode operating system, such as Lin or Xenix), 4 megabytes of RAM for as little as \$795 is a steal. (True, you can get megabytes of memory cheaper by buying expansion kits, but you have to test the chips yourself.) The superhigh speed means you can take advantage of faster slots if you have them. It's also worth considering for your 386.

Balancing these two extreme cases, we rate the value of the King's Bishop Board as satisfactory.

Steven Satchell has 15 years' experience as a systems designer and hardware product programmer.

Review Responses

SILK WANTS ANSWERS

It was with a great sense of anticipation that I read your review of Silk (March 30, 1987), particularly in light of Michael Miller's complimentary remarks in his January 26 First Look column.

I must say that your numerical rating system is particularly confusing, as Silk was rated consistently very good in all but two categories, in which it was rated satisfactory, yet was awarded a 6.7 rating out of a possible 10.

We at Daybreak recognize that reviews must be subject to the biases and preferences of the writer. However, there are several inconsistencies in the review.

It is disturbing to read about market pressures that may be working against Daybreak. We were not aware that competitive market analysis was part of a review of a software program's performance and features.

While we understand that you were sensitive to the "unusually large memory requirements" of Silk, we wonder whether 512K or 640K of RAM on a PC is "unusually" high.

As to the specifics of the review, please provide both Daybreak and your readers with some perspective on your rating system. We are particularly confused regarding what it might take to obtain an excellent rating. You were reasonably thorough in your discussion of the performance of Silk and we accept your rating of very good, though somewhat reluctantly, as we naturally feel that Silk is an extraordinary product.

The review states that there were "no major faults with the documentation" and applauds the use of Silk's unique help system. When you combined the two, you rationalized a very good rating in the face of a help system that, in fact, provides significant new technology, as there is no other help system to our knowledge that will allow concurrent processing during access to help in a context-sensitive format. In this regard, what constitutes excellent?

If we are only satisfactory in terms of ease of use and Silk is "no easier nor more difficult to use than any other spreadsheet," does this mean that other

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spreadsheets are also only satisfactory in this category?

Perhaps the most confusing part of *InfoWorld's* evaluation is where it makes contradictory points in rating Daybreak's support. You mentioned that you were "impressed" by our telephone support, that we provide such support with a toll-free number at no charge, that Silk is not copy-protected, etc. What would make our support excellent instead of very good? Do we have to make house calls?

We at Daybreak are of the opinion that Silk represents an extraordinary technical achievement and that the presence of so many innovative features in one comprehensive product provides substantial productivity enhancements to the user. Indeed, the review discusses many of the features admirably. Yet you chose to rate Silk no higher than very

good and leave your readers with a final thought that Silk is no more than a satisfactory value at \$298 — two-thirds the price of Lotus 1-2-3 and Supercalc! Surely you do not expect us to give such a product away. It would cost your reader no less than \$1,200 in order to purchase products that would deliver most of the features included in Silk for its suggested retail price of \$298. Perhaps you could instruct us on what your definition of "value" is.

Eric W. Gaer
Senior Vice President
Daybreak Technologies Inc.
Torrance, CA

We try to minimize subjectivity and personal preference in our reviews by requiring justification for scoring changes, by listing in our 100-page procedures

manual important items that must be considered, and by choosing reviewers who bring real-world experience as users.

Review categories are weighted, with emphasis on performance and value; Silk's satisfactory rating in value had a disproportionate effect on the score. The market situation facing Silk did not affect its performance score; it is, however, something that customers need to know. The memory requirements are important because they leave the user with less room for the worksheet than 1-2-3 does.

Scoring does not begin at excellent and diminish as negatives are discovered. Instead, the product starts with a score of satisfactory, then is docked or credited for missing or extra features. Excellent scores are given to what is arguably the best product of its kind in the category. A score of very good is not given lightly, and

should be a point of pride. Silk's documentation was satisfactory and earned a bonus score for its extraordinary help system.

Our definition of value is the price/performance trade-off. Supercalc 4.0 and Lotus 1-2-3, Release 2 are both rated satisfactory values; Silk scored lower in performance, which was offset by a lower list price, so it too earned a satisfactory in value. To get excellent in value or that price a product would have had to score excellent in performance, or be extremely low priced, or offer unique features that make it essential to its market. — Editors

InfoWorld welcomes comments about its reviews. Letters are subject to editing for space and clarity. Please address correspondence to the Reviews Editor, InfoWorld, 1060 Marsh Road, Suite C-200, Menlo Park, CA 94025.

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Hardware Index

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Breakthrough 286-12 (Personal Computer Support Group) — Score: 7.2 — A 12-MHz accelerator board for the IBM PC XT. List price, \$595. (4/27/87)

Diskit 2 Plus (Ideas Associates) — Score: 4.7 — A hard disk drive system with a pair of removable 10-megabyte media. List price, \$3,595. (4/27/87)

Hyperdrive FX/20 (General Computer) — Score: 6.2 — A 20-megabyte SCSI external hard disk drive for the Macintosh. List price, \$1,199. (4/13/87)

IBM PS/2 Model 60 (IBM) — Score: 8.7 — The full-size model of IBM's new 80286-based 10-MHz PC AT. List price, \$5,295 (base model). (4/20/87)

Macintosh SE (Apple) — Score: 7.9 — New Macintosh with one expansion slot. List price, \$2,769. (4/13/87)

NEC GB-1 (NEC Home Electronics) — Score: 6.5 — A super-EGA card with Hercules, CGA, EGA, and EGA 480 modes. For the IBM PC. List price, \$549. (4/20/87)

Star Micronics NR-15 (Star Micronics) — Score: 8.1 — A 9-pin, wide-carriage dot-matrix printer. List price, \$799. (4/27/87)

Toshiba T1100 Plus (Toshiba America) — Score: 7.5 — Toshiba's 10-to-13-pound IBM PC XT-compatible laptop with improved LCD. List price, \$2,099. (4/13/87)

Xerox 4020 Color Ink-Jet Printer (Xerox) — Score: 6.5 — A liquid ink-jet printer for color business graphics. For the IBM PC or Commodore Amiga. List price, \$1,595. (4/13/87)

Wong Laptop (Wang Laboratories) — Score: 6.4 — Laptop computer compatible with both MS-DOS and Wang's own software. List price, \$3,530 (base model). (4/13/87)



On the Horizon

By William F. Zachmann

So-Called High-Tech Recovery May Signal the Calm Before the Storm

Just last week I received two different phone calls from business journalists working on "high-tech recovery" stories. It seems like every editor in the general business press has assigned some poor soul to document the alleged incipient rebound in the fortunes of computer companies. I suppose that's logical enough. After all, IBM's profits only dropped 23 percent last quarter.

The normal story angle seems to be to try to identify the "key factor" in the recovery that is supposedly under way. Some of the leading candidates, at least on the PC end, seem to be enhanced connectivity options, improved graphics, and the new OS/2 operating system from Microsoft and IBM.

Nice as all this sounds in theory, I wouldn't bet too many chips on it

There is every reason to expect that OS/2 will be a pig in hardware resources needed.

working out in practice just yet. Notwithstanding the recent surge in editorial interest and the admittedly somewhat-less-dismal-than-expected first-quarter results for several vendors, there are plenty of reasons to remain wary about the prospects for a sustained improvement in the industry.

Externally, the current economic environment may just prove to be the most fragile and dangerous that we have seen in a long time. Continued U.S. budgetary and trade deficits, the ongoing collapse of the dollar and the bond market, and a building crescendo of protectionist stupidity do not bode well for either the United States or world economies.

The hints of bloom in high tech that have become cause for celebration may fall victim to the arctic chill of a worldwide economic downturn later this year. The pieces for the worst economic catastrophe since World War II are certainly in place. Internally, there may not be as much ground for optimism as many seem to think. Of the leading candidates I mentioned earlier to stimulate renewed growth, each has problems.

Connectivity, like last year's buzz phrase *micro-mainframe links*, won't provide any immediate stimulus to demand. Just because IBM has tied a ribbon called SAA (Systems Application Architecture) around a miscellaneous collection of stuff, don't expect things to get much easier than they already are.

Better graphics are good, but they won't stimulate all that much new demand either. Very few software packages and even fewer organizations have really made much use yet of even EGA graphics. The improved resolution, per-

formance, and versatility of VGA graphics is nice, but it isn't going to create new applications overnight either.

Most of all, however, the probability that OS/2's multitasking and expanded memory will boost the industry anytime soon almost exactly approximates zero. In the first place, it will be nearly a year before the operating system is available. Software to take advantage of it is even further off.

More importantly, there is every reason to expect that OS/2 will be an

absolute pig in terms of hardware resources required. Two megabytes of memory and at least a 40-megabyte disk will be the bare minimum required. It looks like a 10-MHz 286 will be barely adequate, at best, to provide acceptable performance under OS/2 for any real use.

Show me someone who believes the scenario that everybody will run out to buy much more powerful (and expensive) systems just to run OS/2, however, and I'll show you someone who believes in chain letters, the Dow Jones industrial

average reaching 3600 by June, and the tooth fairy. It reminds me of the arguments I used to hear from people at IBM about how (in effect) users would buy lots more mainframe MIPS just to run IBM's increasingly inefficient operating systems.

The supposed recovery in high tech is a lot like the surprisingly rapid growth in first-quarter GNP. It much more closely resembles a deceptive calm before the storm than it does the cheery harbinger of spring.

... ..

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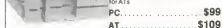
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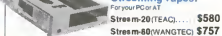
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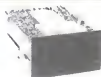

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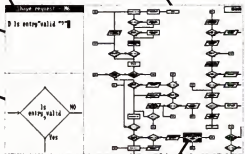
The sample screen display shown below is typical of what you see while editing a chart. Other screen displays are provided for entering titles, changing options, getting 'help' and so on.

STATUS BAR (not to be confused with a well bar) tells you what Interactive EasyFlow is doing at all times

CHART WINDOW gives an overview of your chart. This example shows the "normal" view. "Close-up" view shows a smaller part of the chart in more detail. "Wide-angle" view shows a larger part of the chart at reduced size.

TEXT MESSAGE WINDOW used to enter user text and to display messages from Interactive EasyFlow.

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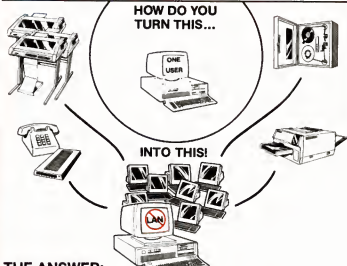
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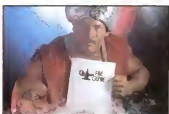
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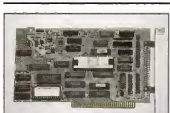
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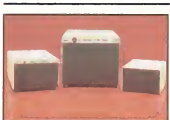
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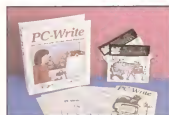
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INFO
WORLD

Price Reductions, New Technology Combine to Spur PC Sales

By Alice LaPlante

Reduced prices, the "excitement" of new technology, and corporate resistance to change have all contributed to the strong PC sales of the past few months.

"It's the best of all possible worlds for PC users," said Jerry Schneider, president of the Capital PC User Group and *InfoWorld* columnist. "You can go out and buy tomorrow's technology for the same price you

would have paid two months ago for a less-advanced machine."

One big reason that personal computer sales are strong is that prices were dramatically reduced when the PS/2 line was announced on April 2, according to Schneider.

"For users who are happy with less than state-of-the-art, prices are still dropping," Schneider said. "For those inter-

ested in being on the cutting edge, there's the excitement of the new machines."

Another reason for strong clone sales is that corporations subject new machines to careful testing before making a purchasing decision. Thus, until the new machines can be fully evaluated, corporations will continue to buy already-approved machines.

"Even though the PS/2 line is

very exciting, most PC professionals will continue buying PCs that meet their current standards until they understand what it all means," said Julian Horwich, director of the Chicago Association for Microcomputer Professionals (CAMP).

Only a few of CAMP's members have bought PS/2 machines in volume, said Horwich. Instead, most companies have simply bought one or two PS/2 machines to use as demos.

"Because of the time it takes to review and evaluate an entire new family of PCs — not to mention having to continue with other management duties — it may be a while before

micro managers actually have time to 'approve' them," Horwich said.

One example of this is happening at Chevron, in San Ramon, California, which is still buying Epson Equity 3 Pluses while ordering a few PS/2s.

"Our users have business needs, and we must continue buying the right PCs to fill those needs," said Martin Waterhouse, an analyst with Chevron's PC services center. "The question we will ultimately need to answer is, 'Will the new PS/2 line meet our needs better?' Until we know the answer to that, we're not going to buy the new machines."

Canion Says Compaq Will Stick With Standard

Bolstered by soaring PC sales that resulted in record first-quarter revenues of \$211 million, Compaq's president and CEO Rod Canion said last week in New York that Compaq would not be offering clones of IBM's new PS/2 line.

Instead, Compaq will focus on providing better functionality within the existing PC standards, Canion said. "IBM has taken dramatic steps to move the standard [it established] behind," he said. "If you look closely you'll find there are no significant user benefits that couldn't have been supplied within [the existing standard]."

Canion stated that the new IBM architecture, including VGA graphics, the 3½-inch drive, and the 32-bit Micro Channel Architecture bus,

provides only limited benefits.

VGA graphics capability will become available on industry-standard PCs before software supporting it is generally available. "So the new graphics capability will take a while before it is really of use to users, and by then it will be available to anyone who wants it on an industry-standard PC," Canion said.

Canion belittled the Micro Channel bus, saying that the technology was interesting but not very useful in a desktop workstation. Compaq will not build a proprietary 32-bit bus, he said. "The 16-bit bus will continue to meet the broadest set of needs in the PC market," he said.

Compaq made a very smart move in anticipation of IBM's announcements, said Julian Horwich, director of

the Chicago Association for Microcomputer Professionals.

"About three weeks prior to the IBM announcement, they came out with a 12-MHz machine and stressed the industry standards vs. something new. Basically it was the same, just a little faster."

"There has been a remarkable resurgence in Compaq sales," said Cy Shelbourn, owner of six Computerland stores in Sarasota, Florida.

"I don't consider Compaq a clone," said Andrew Peters, manager of a Computerland in Elmhurst, Illinois. "Compaq has been very innovative, as opposed to just copying a standard. They are setting standards themselves. The 386 set a standard. The Portable 3 set a standard."

— George Abruzzese and Alice LaPlante

Sales

Continued From Page 1

president of marketing and sales at Compaq of Houston.

"Our backlog situation is worse than it was at the end of March," said Swavely. "Obviously, I wish that we did not have any backlog, but on the other hand, it shows that demand is not falling off."

It is strange but true that since IBM's new products were announced, demand has actually picked up," said Jim Orris, vice president of marketing for the systems products at AST of Irvine, California. During the first quarter, AST sold more than \$14 million worth of its Premium/286 AT compatible, he said. "We are sold out through the current quarter."

Even Apple, which has bucked the industry standard, saw sales rise during the first quarter.

Analysts and manufacturers say AT compatibles are selling well now in part because a key component of the PS/2 line — the OS/2 operating system — is not available. "People are saying that they can't wait for the rest of IBM's line," said Gorton.

"This is an applications soft-

ware-driven business," said Michael Dell, chairman and CEO of PCs Limited of Austin, Texas. "IBM or anyone else can come out with anything they want, but if there is nothing out there to support it, then there is no impetus for users to go out and buy the product."

Firms will likely resist the PS/2 line until IBM has eliminated confusion surrounding components, said Swavely.

The current sales surge is also due to the release of pent-up demand, said Gorton. Even IBM said it shipped more PCs and ATs in the first quarter this year than any other first quarter. Once corporate evaluations are done — and OS/2 is closer — compatible sales may flatten, he added. "But by that time, others will have OS/2 and additional hardware features," said AST's Orris.

Meanwhile, IBM's Model 30 is already being discounted in the gray market. Last week, 47th Street Photo in New York was selling the PS/2 Model 30 with a 20-megabyte hard disk for \$2,000, \$399 below IBM's suggested retail price.

IBM warned that its warranty is only valid when purchased from an authorized IBM dealer.

— George Abruzzese contributed to this story.

Faraday Introduces CMOS Chip Sets

Faraday Electronics Inc. last week introduced CMOS-based chip sets that the company said would allow IBM PC clone manufacturers to produce compact low-power and high-speed systems compatible with IBM's PS/2 Model 30, PC XT, and PC AT systems.

The two 8- and 16-bit chip sets reduce the number of logic circuits inside the PC into two or four integrated circuits, respectively, said the company.

The 10-MHz two-chip set for the Model 30 and XT replaces 79 discrete components, reducing the board space required by

77 percent. The four-chip, 12-MHz AT set reduces the required space to one-seventh the typical size by reducing the number of chips required from 95 to 19, according to Faraday. Production quantities are expected within 10 weeks of an order from a computer manufacturer, the company said.

— Priscilla M. Chahal

Adobe Systems Announces Plan To Develop Illustrator for IBM PC

PALO ALTO, CA — Adobe Systems Inc. said last week it plans to develop an IBM PC version of its Adobe Illustrator graphics program, but added that release of the product is still many months away.

"We started working on the program just a few weeks ago, and we really don't even have a spec for it yet," said John Kunze, Adobe's product manager for Illustrator. "In this initial phase, we are researching how it is doable, and we won't know that for a while."

Although the program will probably run under a version of

Microsoft Windows, other product specifications, such as whether it will run under MS-DOS or OS/2, still have not been decided, Kunze said. "Right now the technical staff is just in a research phase on the product," he said.

The company took three months to do the technical specifications for the Macintosh version and six months to write the code and bring the product to market, Kunze said.

"I don't know if we will have as easy a time in the PC environment," Kunze said.

— Eric Lach

Tandy

Continued From Page 1

standard, it will support the new format on its software and hardware. Tandy's Models 1000 and 3000 are already designed to accept the smaller drives.

But Tandy declined to make any commitments about including compatibility for IBM's VGA display and Micro Channel bus in the 80386-based machine.

"The first move is to understand VGA," Yamagata said. "There is a possibility that we will support it if that is what our customers want and if a stan-

dard develops. If we feel that our customers need the Micro Channel, then we will offer that as well."

Tandy president John Roach said that hardware-based compatibility with IBM PCs is now clearly dead and that future compatibility of its machines with IBM offerings would come through software instead, including the use of Windows.

At the same time it outlined its commitment to new Intel processors, Tandy representatives told the group it would make no major hardware enhancements to its Tandy 6000, a 68000-based system that uses the Xenix operating system. Many of the 6000's business

users said they felt abandoned by Tandy's decision.

"We have invested a lot of time and money into the 6000 and Xenix area, and it will take a lot of money to change," said Linda Greiner, co-owner and secretary-treasurer for Greiner Inc., a construction equipment company in Glenmoore, Pennsylvania.

Kent Roberts, product manager for the Tandy 3000 and 6000, said that Tandy is upgrading the Xenix operating system to Version 3.2, which will be available in the third quarter. The new version will include code corrections, high-resolution graphics, and additional memory capabilities.



Industry Executives Get a Piece of the Rock

It was a starless night, and there was a stiff breeze out on the bay. My little dinghy was being tossed by the churning surf as I neared the rocky shore. My heart was pounding.

Then there I was, standing on The Rock—Alcatraz, that is.

Some people really know how to throw a party. Proving this industry is making every attempt at a dramatic comeback, 600 high-technology executives and investors wine and dined inside the infamous, albeit gloomy, rat-infested prison in the San Francisco Bay.

All this eerie reverie was the making of high-tech investment firm Hambrecht &

Quist, which is said to have dropped over \$60,000 on the gig, all with the goal of proving to the investment world that the once-rumored-to-be-floundering company should be taken a little more seriously. Seriously folks.

But it turned out to be just my kind of bash. I quietly flung myself over the prison wall and onto the grounds, where I found myself surrounded by some execs discussing that infamous Big Blue ball and chain.

HERE WE GO AGAIN. Seems these guys are really confused about IBM's recent Ethernet announcements. I mean, they

could handle a little fling with Ethernet in the PC RT, and blinked a few times when the 3370 featured support for the protocols, but now this? I think the warden is finally coming to his knees.

Actually, I hear there's a lot of behind-the-scenes haggling going on over this one, not the least of which is hopefulness about landing an enormous Air Force bid next year. Of course, anything in the defense arena has got to have TCP/IP support, and IBM is supposedly sick and tired of missing out on contracts for lack of it. And this is no ordinary contract. This is a backup system for the space shuttle we're talkin' about. Big deal. We

all know how reliable network technology is.

I also have it on excellent authority that a certain unnamed Apple, appearing in a certain trade paper about IBM manufacturing customized 386 chips is a pipe dream. IBM *does* have the option of doing so in the future—if it so chooses. But currently, no manufacturing of such chips is taking place.

PEDDLING BACKWARD. Meanwhile, Hewlett-Packard is doing a lot of back-tracking these days. At the same time that it's reversing its position to support Postscript on Laserjet printers, HP is also showing around a version of its Vectra IBM AT compatible that's been "deengineered" to be more IBM compatible.

To do this, its taking out all the nifty features the HP engineers had so much fun designing, such as the Human Interface Loop connection on the keyboard, which looks like an RJ-11 plug. Users weren't happy because they couldn't replace the Vectra's keyboard, which has a reputation for mushiness, with third-party keyboards. The HIL plug is being taken out of the keyboard, and a plain old keyboard plug is being inserted in its place. Of course, HP's should be used to this, having had to throw out its easy-to-install, faster hard disk controller for the IBM type last year.

While on the subject of HP, three new Spectrum systems to be unveiled on May 29, according to my jitters.

WHO'S MINDING THE STORE? Never having been stood up by a billionaire, I wouldn't know how it feels. But a buddy of a friend of mine's cousin, who writes for a national business rag that I won't name but which appears on about 5 million desktops a day, found himself on a Manhattan street corner waiting to have an interview with that venerable mastermind Bill Gates. And boy did he wait. It seems that the man behind the wheel of the software industry forgot about daylight-saving time and missed his flight out of Seattle. I'm betting OS/2 misses its plane too.

Taking after his buddy, Microsoft cofounder Paul Allen, having left the nest a few years ago to form Asymetric, is slipping a bit off schedule as well. The heavy-duty business application the company is rumored to have under tight wraps is now three months behind schedule. I'm told to expect it in the second quarter of 1988 instead of just after the first of the year. Slipping behind schedule never made anybody rich. Or did it?

WARNING IT. On the other coast Wang Labs appears to have some pretty interesting projects going on, including a card that will let PCs on a token ring network talk to Wang minis. One source at a Fortune 1000 company said his firm was recently testing a Wang AT compatible equipped as a Token Ring-VS gateway.

GIVE 'EM LIFE. Back on the subject of prison, a little Southern California-based computer firm I'll refrain from naming here has been caught in the act of using a copyrighted BIOS in its own labeled machines. Be seeing you on The Rock.

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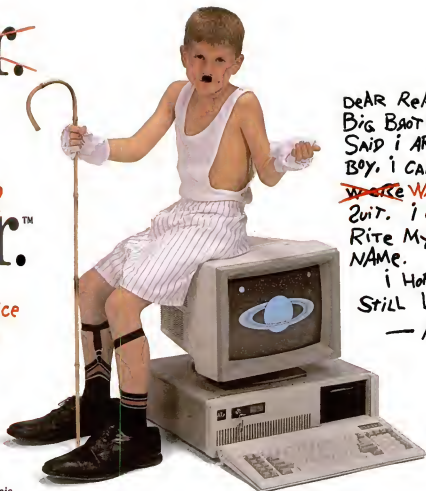
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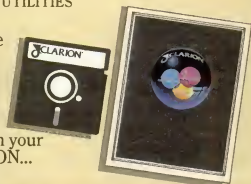
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